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Traffic Safety
Problem Identification

FY 2008

July 20, 2007

State Highway Traffic Safety Bureau
Rail, Transit and Planning Division
Montana Department of Transportation
2701 Prospect Avenue
Helena, Montana 59620-1001
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A. INTRODUCTION

This document is used to identify and analyze trends and to evaluate problem areas related to highway traffic safety in Montana with respect to National Highway Traffic Safety Administration funding. The data within is used for the planning of the Highway Safety Program for the upcoming fiscal year. The analysis is intended to provide information to highway traffic safety specialists that will assist in the design of counter-measures for specific problem areas.

Much of the information contained within this publication originates from traffic crashes occurring upon public roadways. The trends and contributing factors of the resultant injuries and fatalities along with the demographics for the drivers and vehicles involved are presented. Rates are calculated using vehicle miles, licensed drivers or population when possible.

Data is first presented on crash numbers, general exposure and demographics. Included in this are population statistics, driver license information, vehicle registrations, vehicle miles traveled and breakdowns of driver demographics within crashes. Information is presented in the latter half of this document on potential problem areas and items of possible interest such as impaired driving; occupant protection; speed; hazardous actions; motorcycles and pedestrians. Many tables contain ten years of data. In these tables, the latest year of data is compared to the year previous and the average of the previous five years. The last two lines of these tables usually contain the percentage change for these comparisons.

Some crashes such as minor single vehicle run off the road crashes, wild animal crashes and other minor crashes are not always reported to law enforcement. Most local law enforcement agencies are very good at submitting reports of investigated crashes to the Montana Highway Patrol. Few crash reports are received from reservation law enforcement agencies because of the status of reservations as sovereign nations. The database does not contain every crash that meets the reporting criteria, but should be very nearly complete for crashes involving injuries and fatalities.

The data elements within the crash record system include information on vehicles, roadway, drivers, passengers, pedestrians, bicyclists, and general crash details. Some tables summarize crash counts, while others summarize the number of drivers, number of vehicles, number of occupants or number of injuries and these differences can be subtle and confusing. In addition, sections of tables may concern all crashes while other sections contain data for fatal crashes or other subsets. Special care must be taken by the reader to understand what exactly is being summarized within each table.

B. TRAFFIC CRASH AND EXPOSURE STATISTICS

Montana, along with most of the Rocky Mountain States, has unique problems in traffic safety. Unfortunately, Montana is often at the extreme even among these states. The Rocky Mountain States tend to be high on roadway departure fatalities and the percent of miles driven that are rural.

Very few of Montana's vehicle miles traveled occur in the urban environment. A high percentage of miles traveled are at rural speeds compared to more urban states, thus increasing the likelihood of fatal crashes. The average urban fatality rate is less than half of the rural fatality rate (about 1.0 compared to 2.3). Since Montana has the highest percentage of rural vehicle miles traveled in the nation, it should be no surprise that Montana has the highest fatality rate in the nation. The Insurance Institute for Highway Safety (IIHS) released a study during March 2006, in which they normalized various factors including rural versus urban fatality rates. They found that Montana moved from #50 to #27 in fatality rate when normalized on urban vs. rural. So even though NHTSA considers Montana as the worst state in fatality rate, the states are not playing on a level playing field. The IIHS paper notes, "For example, 100 million vehicle miles traveled in the U.S. state of New Jersey, which is relatively urban, do not indicate the same exposure to risk of crash deaths as the same number of miles traveled in Montana, a very rural state."

According to IIHS, fatality rates are also affected by demographics such as median incomes, school spending per pupil and percentage of population with college degrees. Because median incomes are low and school spending is low, fatality rates would be higher than average in Montana. Seventy percent of the variability of fatality rates of states comes from rural versus urban and demographics.

Single vehicle road departure crashes account for 30% of all crashes, but over 61% of all fatal crashes. Single vehicle fatal crashes account for 58% of all fatal crashes nationally. In Montana over 70% of all fatal crashes are single vehicle crashes

American Indian fatalities as a percentage of all fatalities tend to be high for the Rocky Mountain States. These fatalities have higher rates of alcohol involvement. Each year in Montana, 13 to 20 percent of traffic deaths are Indian fatalities. Over 26% of the alcohol related fatalities in Montana were American Indian fatalities during 2006.

For two straight years total fatalities in Montana have increased. There were 34 more fatalities in Montana during 2006 than in 2004. Injury crashes increased by 3% over 2005, while all crashes were slightly lower. Ten years of reportable crash and injury data appear in Table 1.

Injury crashes and especially severe injury crash counts tend to be more accurate indicators of safety trends in Montana than do crashes and fatalities. These injury crashes can represent change without as much of the variation caused by the small number associated with fatalities. Total Crashes tend to have variation that is strongly associated with the amount of icy roads. Severe injury crashes are defined as those

Table 1
Crashes by Severity

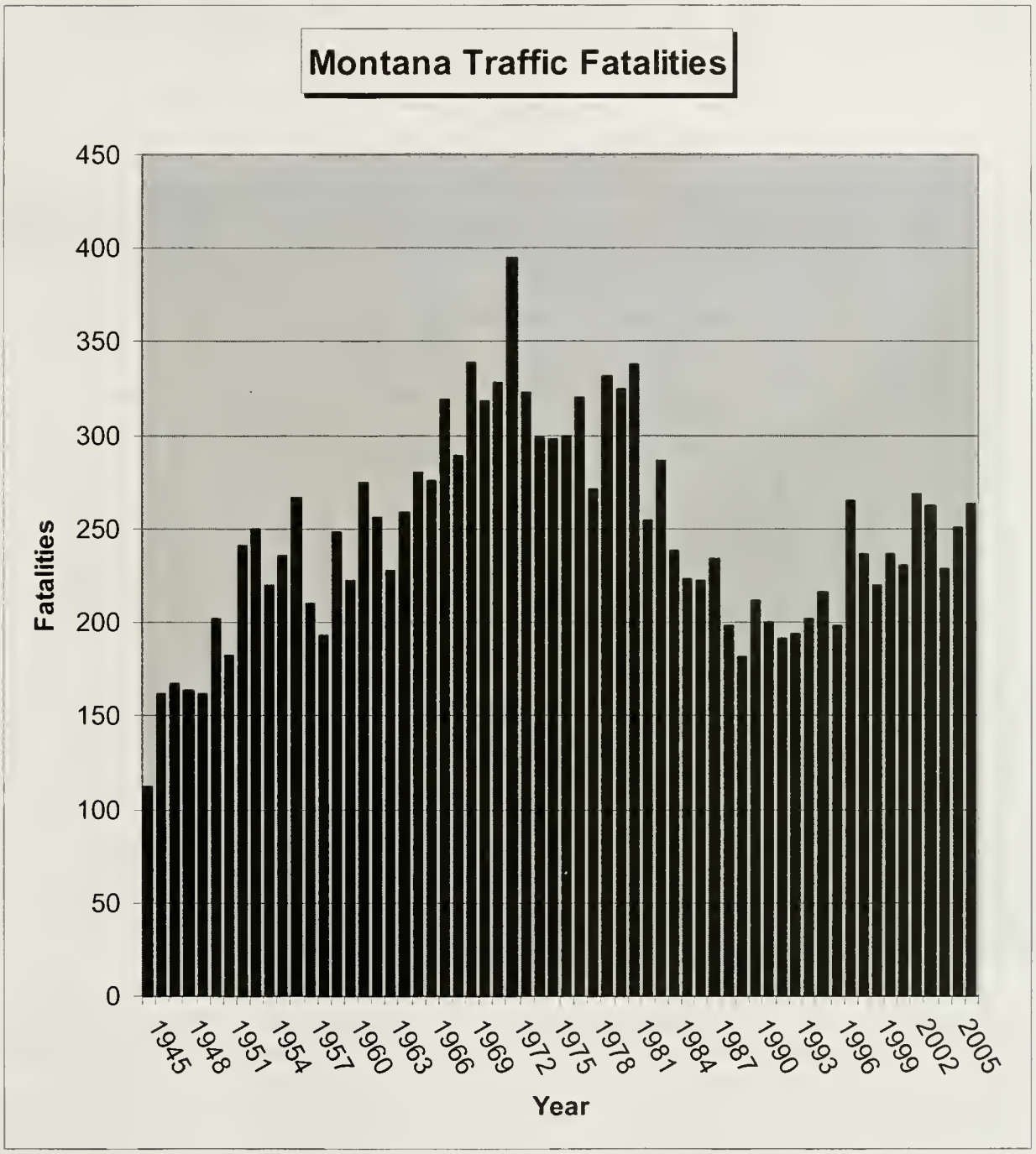
Year	All Crashes	Fatal Crashes	Injury Crashes	Property Damage Crashes	Fatalities	Injuries
1997	22,619	223	6,951	15,445	265	10,688
1998	22,068	208	6,728	15,132	237	10,075
1999	21,078	194	6,769	14,113	220	10,459
2000	22,254	203	7,053	15,000	237	10,798
2001	21,846	201	6,220	15,420	230	8,982
2002	23,527	232	6,479	16,816	269	10,086
2003	23,160	239	6,229	16,681	262	9,632
2004	21,783	209	6,000	15,570	229	9,263
2005	22,376	224	6,066	16,086	251	9,211
2006	22,186	226	6,245	15,712	263	9,470
Chg 1 Yr	-0.8%	+0.9%	+3.0%	-2.3%	+4.8%	+2.8%
Chg 5 Yr	-1.6%	+2.3%	+0.7%	-2.5%	+6.0%	+0.4%

Source: Traffic Information System (TIS) – Montana Department of Transportation

crashes involving a fatality or an incapacitating injury. This information will be shown in Table 4.

A Montana history of fatality numbers on public roadways is presented in the graph on the following page. Fatalities reached an all time high of 395 during 1972. The lowest number of fatalities since 1950 was 181, which occurred during 1989, the second year of Montana's seat belt law. The number of fatalities in 2006 was the fifth time that fatalities surpassed 250 during the last 22 years. This has occurred four times in the last five years which seems to show that the overall trend is moving up. During the period from 1988 to 1996, Montana averaged 199.1 fatalities. From 1997 until 2006, this average has jumped to 246.3 and seems to be continuing to climb as shown on the chart on the following page. This shows a clear increase during the last 10 years when compared to the 9 years prior to that and coincides with the end of the national speed limit.

Figure 1


Montana Traffic Fatalities
Fatalities
450
400
350
300
250
200
150
100
50
0
1945
1948
1951
1954
1957
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
1990
1993
1996
1999
2002
2005
Year

There are several exposure statistics in the area of traffic safety. These include number and type of vehicles, number of licensed drivers by age and gender, physical road miles, population, and the number of vehicle miles driven. Table 2 displays Vehicle Miles Traveled (VMT), which is the estimated number of total miles driven by all vehicles on Montana public roads. This table also includes licensed drivers and registered motor vehicles. VMT is the exposure number that appears to have the greatest influence on the amount of traffic crashes that occur in Montana.

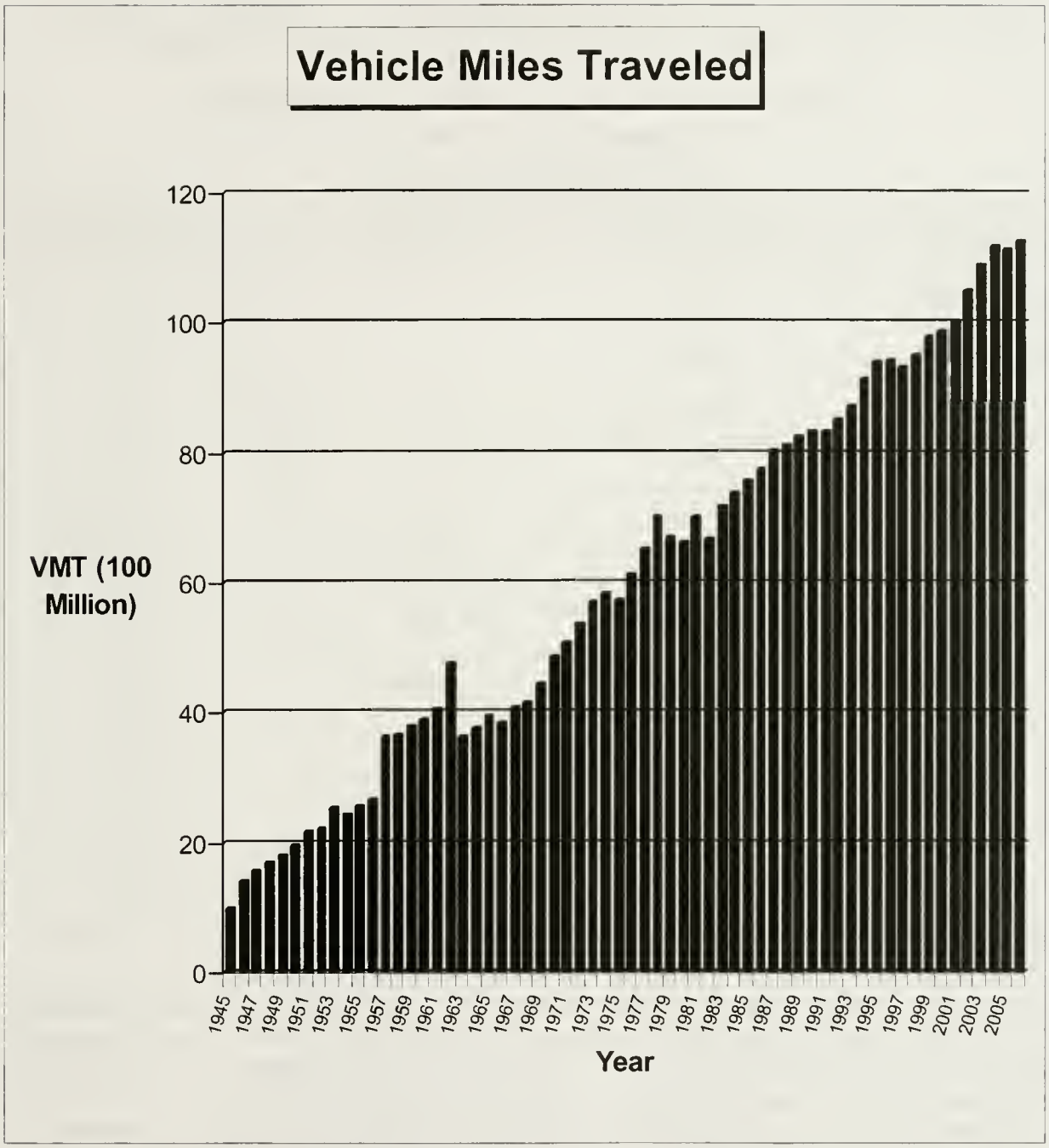
Table 2
Crash Exposure By Factors

Year	VMT (100 Million Miles)	Licensed Drivers	Registered Motor Vehicles (plus trailers)
1997	93.2	NA	1,028,570
1998	94.9	646,512	1,042,183
1999	97.8	NA	NA
2000	98.6	678,899	1,009,930
2001	100.1	683,351	1,135,491
2002	104.9	694,743	1,165,808
2003	109.0	704,509	1,207,314
2004	111.8	712,880	1,248,215
2005	111.3	715,512	1,356,165
2006	112.6	723,976	1,434,433
Chg 1 Year	+1.2%	+1.2%	+5.8%
Chg 5 Year	+4.8%	+3.1%	+17.3%

Source: VMT – Montana Department of Transportation
Drivers Licenses and Registered Vehicles – Department of Justice

The annual vehicle miles traveled are shown on the following chart. These numbers increase almost every year. During 1972, the vehicle miles traveled (VMT) for Montana was 5.4 billion and 395 fatalities occurred. Now in 2006, this figure has more than doubled at more than 11 billion miles traveled with 263 fatalities occurring. Even when crash numbers, injuries and fatalities are held stable, gains in rates are made because of increases in exposure. Registration numbers are no longer particularly valid, since there are several vehicle types that require only a one time registration. So vehicles that are no longer used still could appear in the counts. A chart of the history of VMT is shown on the following page.

Figure 2


Vehicle Miles Traveled
VMT (100 Million)
120
100
80
60
40
20
0
1945
1947
1949
1951
1953
1955
1957
1959
1961
1963
1965
1967
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
Year

The fatality rate for Montana was 7.64 fatalities per hundred million miles traveled during 1969. This rate has been generally decreasing since then. It had decreased to 4.92 by 1980. During 2006, the fatality rate was 2.33, which was higher than the record low rate during 2004.

The injury rate was 0.84 per one million miles traveled for the year 2006. The crash rate was 1.97, which was below the rate for 2005 but just higher than 2004.

Table 3
Statewide Crash Rates
(Per Vehicle Miles Traveled)

Year	Fatality Rate (per 100Million VMT)	Injury Rate (per 1Million VMT)	Crash Rate (per 1Million VMT)
1997	2.84	1.15	2.43
1998	2.50	1.06	2.33
1999	2.25	1.07	2.15
2000	2.40	1.04	2.26
2001	2.30	0.90	2.18
2002	2.57	0.96	2.24
2003	2.40	0.88	2.13
2004	2.04	0.83	1.95
2005	2.26	0.83	2.01
2006	2.33	0.84	1.97
Chg 1 Year	+3.1%	+1.2%	-2.0%
Chg 5 Year	+0.7%	-4.5%	-6.3%

Source: TIS and Traffic Data Collection - Montana Department of Transportation

Historically, western rural states have tended to have rates above the national average. One of the reasons is the greater percentage of rural miles traveled which translates to higher average speeds. During 2001, the United States rural fatality rate was 2.3 while the urban fatality rate was 1.0. For the nation, rural fatalities accounted for 61% of the traffic fatalities, while in Montana over 92% of the fatalities were rural fatal crashes. From this information, it stands to reason that the expected Montana rate would be much closer to 2.3 than the national rate of 1.5. Figure 3 compares the national fatality rate with the Montana rate.

Figure 3

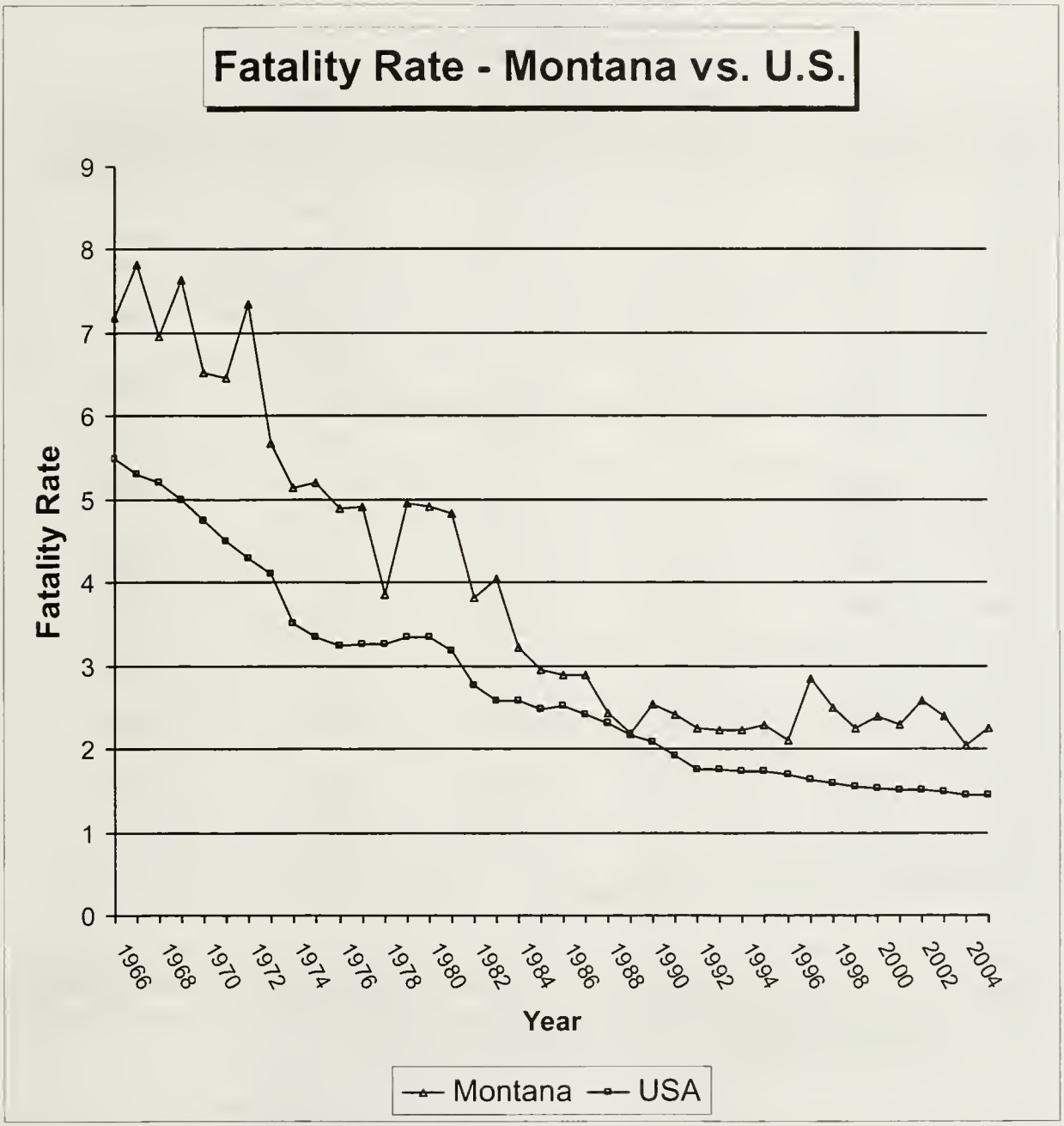

Fatality Rate - Montana vs. U.S.
Fatality Rate
0
1
2
3
4
5
6
7
8
9
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
Year
Montana
USA

Table 4 displays the distribution of injury severity to persons involved in motor vehicle crashes for the last ten years. Injury severity may aid in determining whether restraint use and airbags are saving lives and reducing the level of injury severity. Also displayed are Severe Injuries (Fatalities + Incapacitating), which may be the best true overall indicator for traffic crash trends.

Table 4
Injury Severity
(persons)

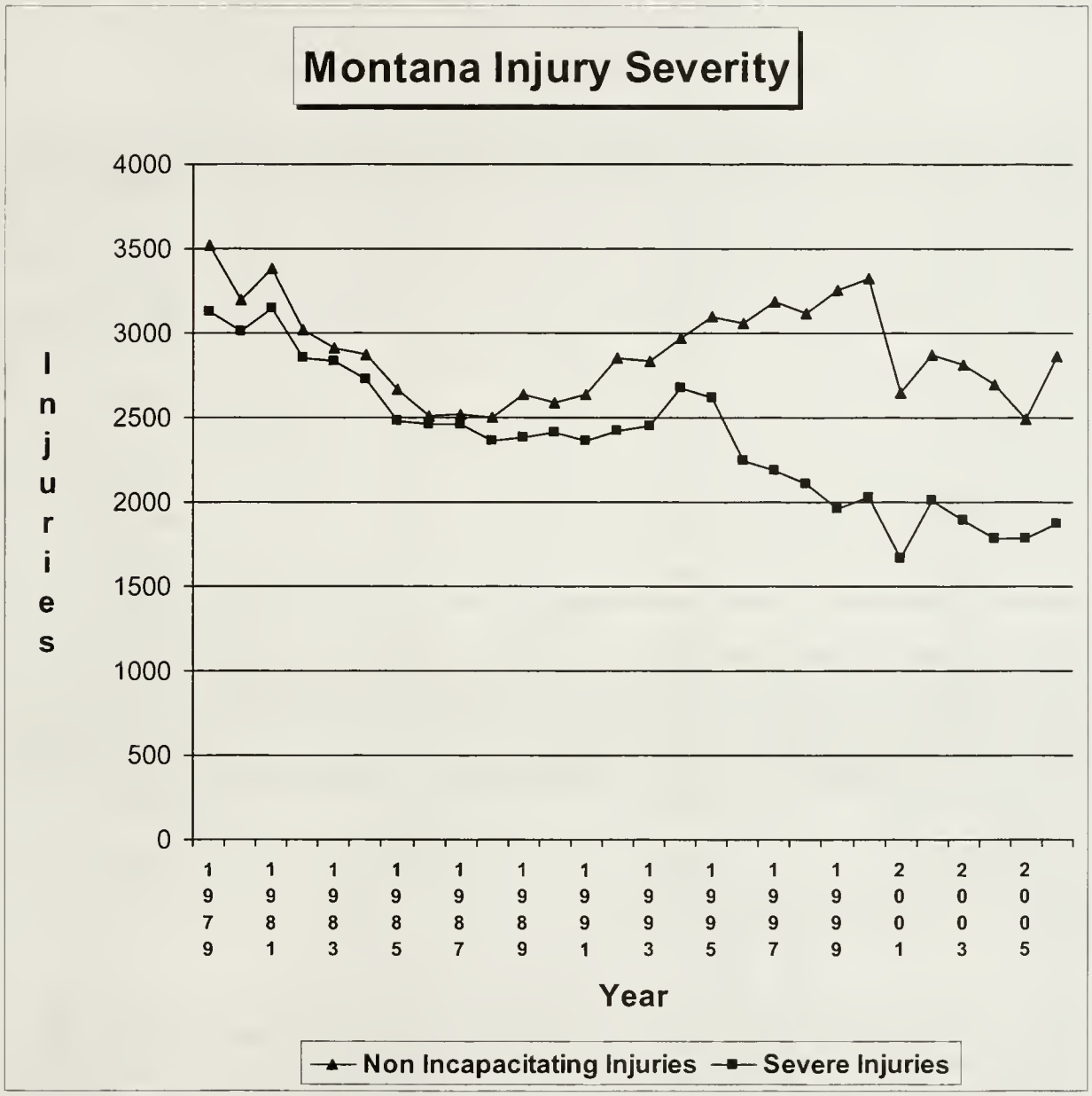
Year	Fatalities	Incapacitating Injury	Non Incapacitating Injury	Possible & Other Injury	Severe Injuries (Fatalities plus Incapacitating)
1997	265	1,917	3,187	5,584	2,182
1998	237	1,834	3,044	5,202	2,071
1999	220	1,739	3,254	5,466	1,959
2000	237	1,790	3,325	5,683	2,027
2001	230	1,433	2,645	4,904	1,663
2002	269	1,738	2,876	5,472	2,007
2003	262	1,634	2,812	5,186	1,896
2004	229	1,557	2,692	5,013	1,796
2005	251	1,541	2,509	5,161	1,792
2006	263	1,607	2,859	5,004	1,870
Chg 1 Yr	+4.8%	+4.3%	+13.9%	-3.0%	+4.4%
Chg 5 Yr	+6.0%	+1.7%	+5.6%	-2.8%	+2.1%

Source: TIS - Montana Department of Transportation

Severe injuries (fatalities plus incapacitating injuries) have decreased over 28 percent since 1995. The change downward in the number of severe injuries would appear to be the most significant change in data within Montana during the last few years although this has leveled off during the last four years.

It would seem that occupant restraints, airbags and child restraints have accounted for at least part of this decrease. The change in severity is also the result of more forgiving roadways with engineering improvements and quicker emergency medical service response times due to cell phones. Figure 4 on the following page shows clearly this history of injuries over time.

Figure 4


Montana Injury Severity
4000
3500
3000
2500
2000
1500
1000
500
0
Injuries
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
Year
Non Incapacitating Injuries
Severe Injuries

The following table examines rural fatal crashes in Montana. Fatal crashes occur mostly on rural roads within the state, where there are higher speeds than in urban crashes. Seventeen fatalities occurred on urban roads during 2006 from seventeen different crashes. The other 246 fatalities occurred on rural roads from 209 crashes. Similarly there were 305 incapacitating injuries on urban roads while 1,302 serious injuries occurred in the rural setting.

Table 5
Rural Fatal Crashes

Year	Fatal Crashes	Rural Fatal Crashes	Percent Rural
1997	223	208	93.3%
1998	208	180	86.5%
1999	194	176	90.7%
2000	203	185	91.1%
2001	201	187	93.0%
2002	232	209	90.1%
2003	239	214	89.5%
2004	209	184	88.0%
2005	224	194	86.6%
2006	226	209	92.5%
Chg 1 Year	+0.9%	+7.7%	+6.8%
Chg 5 Year	+2.3%	+5.8%	+3.4%

Source: TIS - Montana Department of Transportation

Rural crashes averaged 1.29 vehicles per crash, while urban crashes averaged 1.96 vehicles. Crash configurations are much different. Most rural crashes (74.2%) involve just one vehicle, while most urban crashes (80.5%) involve two vehicles. Tables 7 and 8 on the following page tabulate rural and urban crashes by the number of vehicles involved. A large number of run off the road single vehicle crashes occur on the rural roads of Montana. City crashes tend to be collisions of multiple vehicles at or near intersections. These events tend to be multiple vehicles crashing at an angle or one vehicle striking the rear of another vehicle.

Table 6

Number of Involved Vehicles --- Rural vs. Urban Crashes – 2006

Vehicles	Rural		Urban		Total	
	Crashes	Percent	Crashes	Percent	Crashes	Percent
1	8,020	74.2%	1,347	12.0%	9,367	42.5%
2	2,637	24.4%	9,059	80.5%	11,696	53.0%
3	139	1.3%	732	6.5%	871	3.9%
4	13	0.1%	95	0.9%	108	0.5%
>=5	3	0.0%	16	0.1%	19	0.1%
Total	10,812	100.0%	11,249	100.0%	22,061	100.0%

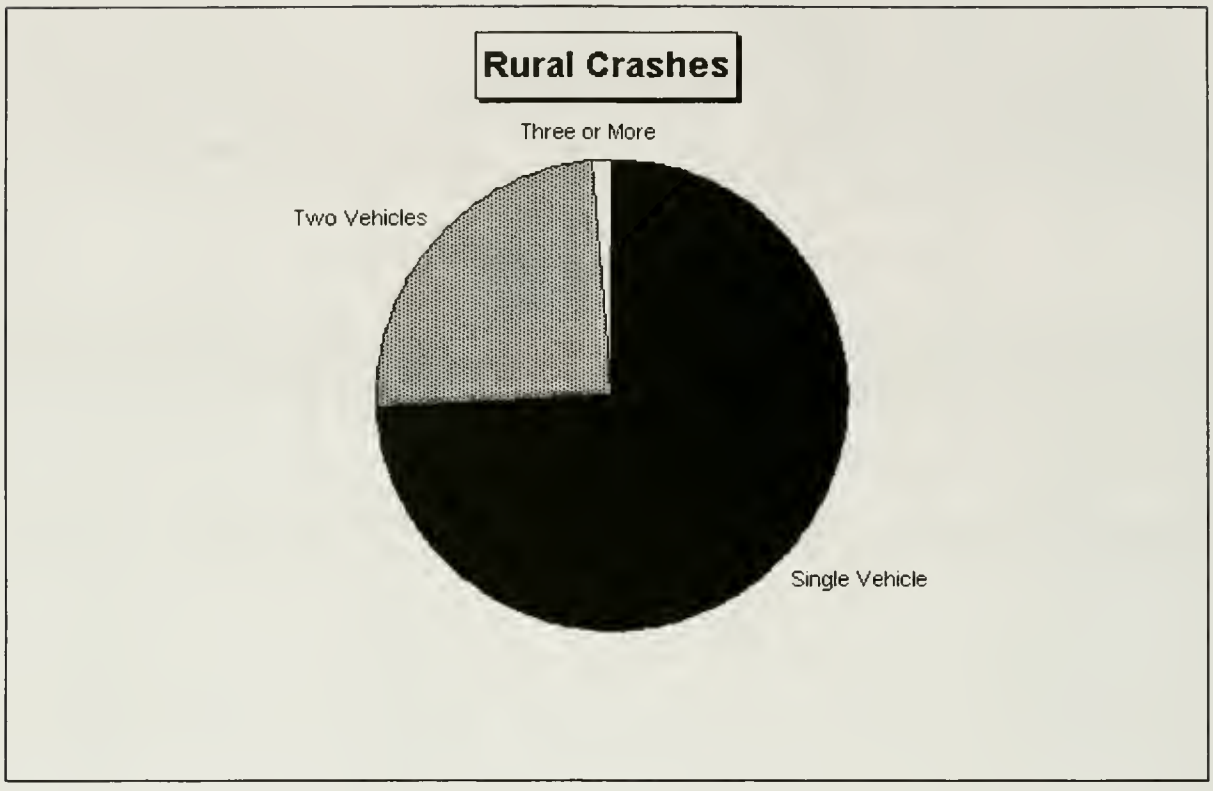
Table 7

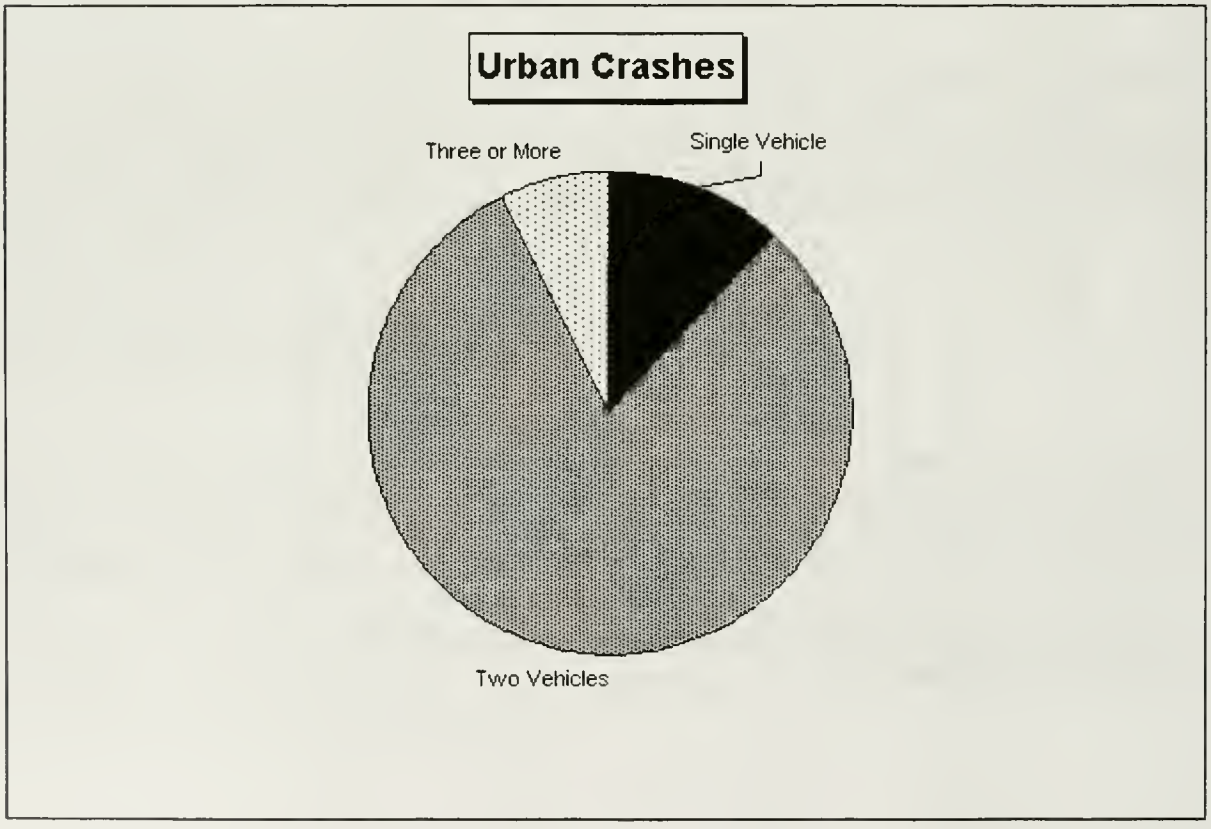
Number of Involved Vehicles --- Rural vs. Urban Fatal Crashes – 2006

Vehicles	Rural		Urban		Total	
	Fatal Crashes	Percent	Fatal Crashes	Percent	Fatal Crashes	Percent
1	148	70.8%	11	64.7%	159	70.4%
2	54	25.8%	5	29.4%	59	26.1%
3	6	2.9%	1	5.9%	7	3.1%
4	1	0.5%	0	0.0%	1	0.4%
>=5	0	0.0%	0	0.0%	0	0.0%
Total	209	100.0%	17	100.0%	226	100.0%

Figure 5 on the following page shows the number of vehicles by percentage in both rural and urban situations.

Figure 5


Rural Crashes
Three or More
Two Vehicles
Single Vehicle


Urban Crashes
Three or More
Single Vehicle
Two Vehicles

When examining type of collision for multiple-vehicle crashes in rural incidents, rear end collisions were most numerous. Right angle crashes and sideswipe crashes were next. These collision-types accounted for over 77% of the total. For Urban areas, rear end crashes were the most common collision type, followed closely by right angle crashes. Rear end and right angles crashes accounted for nearly 68% of urban crashes.

Table 8
Type Of Collision --- Rural vs. Urban Crashes - 2006
(Two or More Vehicles)

Type of Collision	Rural		Urban	
	Crashes	Percent	Crashes	Percent
Rear End	921	33.0%	3,367	34.0%
Sideswipe – Same Direction	326	11.7%	747	7.5%
Sideswipe – Opposite Direction	244	8.7%	184	1.9%
Left Turn – Same Direction	52	1.9%	96	1.0%
Left Turn – Opposite Direction	103	3.7%	294	3.0%
Right Angle	665	23.8%	3,353	33.9%
Right Turn – Same Direction	11	0.4%	61	0.6%
Right Turn – Opposite Direction	4	0.1%	29	0.3%
Head On	159	5.7%	92	0.9%
Other	307	11.0%	1,679	16.9%
Total	2,792	100.0%	9,902	100.0%

Economic loss from motor vehicle crashes is shown for recent years in Table 9. These losses are calculated using national estimates for average property damage only crash cost, injury cost by injury level and fatality cost, which are provided by the National Safety Council. These estimates cover wage loss, medical expense, insurance administration and property damage costs. Indirect costs for human suffering and loss are more intangible and are not included as part of this estimate.

Table 9
Estimated Economic Loss in Crashes
(Millions of Dollars)

Year	Economic Loss
1997	$532
1998	$498
1999	$481
2000	$525
2001	$500
2002	$605
2003	$623
2004	$572
2005	$595
2006	$629
Change 1 Year	+5.7%
Change 5 Year	+8.6%

Source: Montana Department of Transportation

Economic loss due to traffic crashes increased during 2006. Last year the economic loss for Montana crashes was over 6/10's of a billion dollars. That is an average of over $670 for every citizen in Montana. Loss resulting from alcohol related crashes was about 193 million dollars.

C. CRASH DEMOGRAPHICS

1. Gender of Drivers

Male drivers are more likely to be involved in crashes than female drivers, when prorated by the number of licensed drivers. However, when based upon average national vehicle miles driven by gender, this difference in crash rates largely disappears. No state statistics on miles traveled by gender are available.

Driver involvement in crashes by gender is shown in Table 10. While male involvement is 58.6% of all crashes, involvement by females has been increasing consistently over the past 20 years as vehicle miles driven increases for female drivers.

Table 10
Driver's Gender in Crashes

Year	Gender of Drivers			Percent of Total	
	Female	Male	Total	Female	Male
1997	13,943	20,915	34,858	40.0%	60.0%
1998	12,818	19,382	32,200	39.8%	60.2%
1999	12,248	18,904	31,152	39.3%	60.7%
2000	13,237	20,008	33,245	39.8%	60.2%
2001	13,189	19,036	32,225	40.9%	59.1%
2002	14,623	21,082	35,705	41.0%	59.0%
2003	14,330	20,650	34,980	41.0%	59.0%
2004	13,578	19,428	33,006	41.1%	58.9%
2005	13,943	19,720	33,663	41.4%	58.6%
2006	13,651	19,256	32,907	41.5%	58.5%
Chg 1 Year	-2.1%	-2.4%	-2.2%	+0.2%	-0.2%
Chg 5 Year	-2.0%	-3.6%	-3.0%	+1.0%	-0.7%

Men have a disproportionate involvement in **fatal** crashes. Past studies have shown that men have higher involvement in overturns, other non-collision crashes, crashes into fixed objects and the striking of animals. Much of this is due to men's much higher

involvement in alcohol-related crashes. Table 11 follows with information on the gender of drivers in fatal crashes.

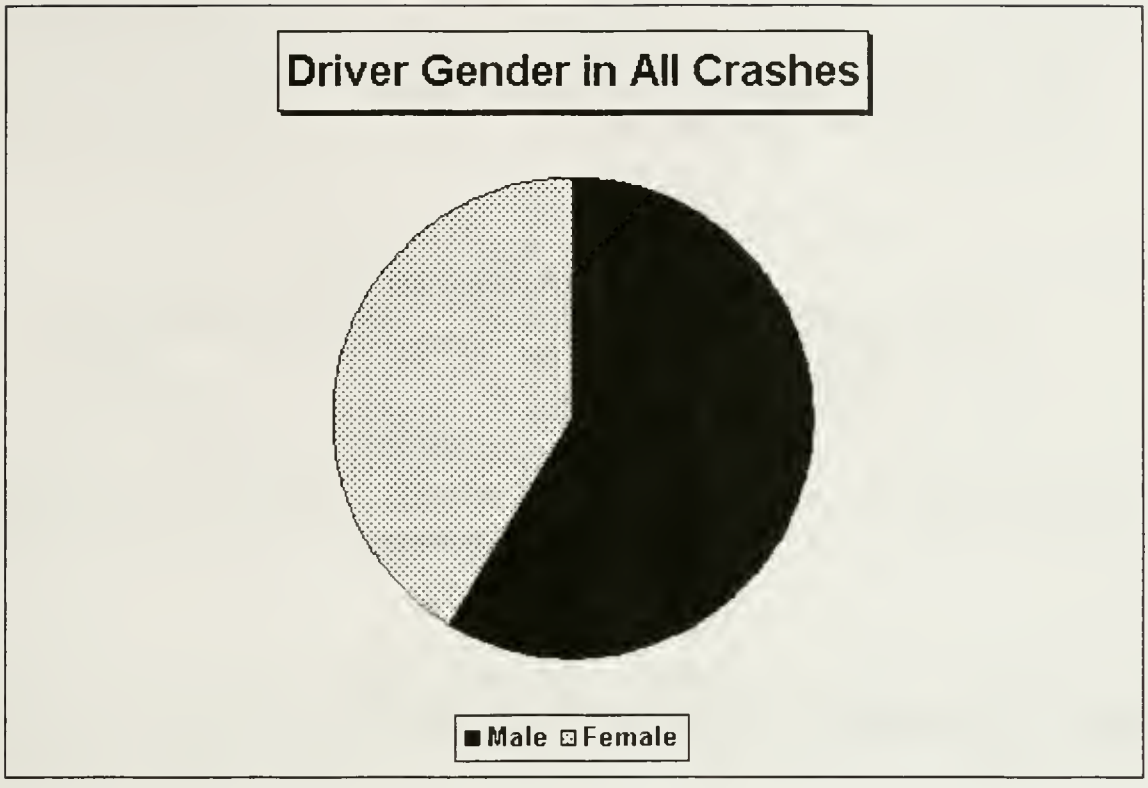
Table 11
Driver's Gender in Fatal Crashes

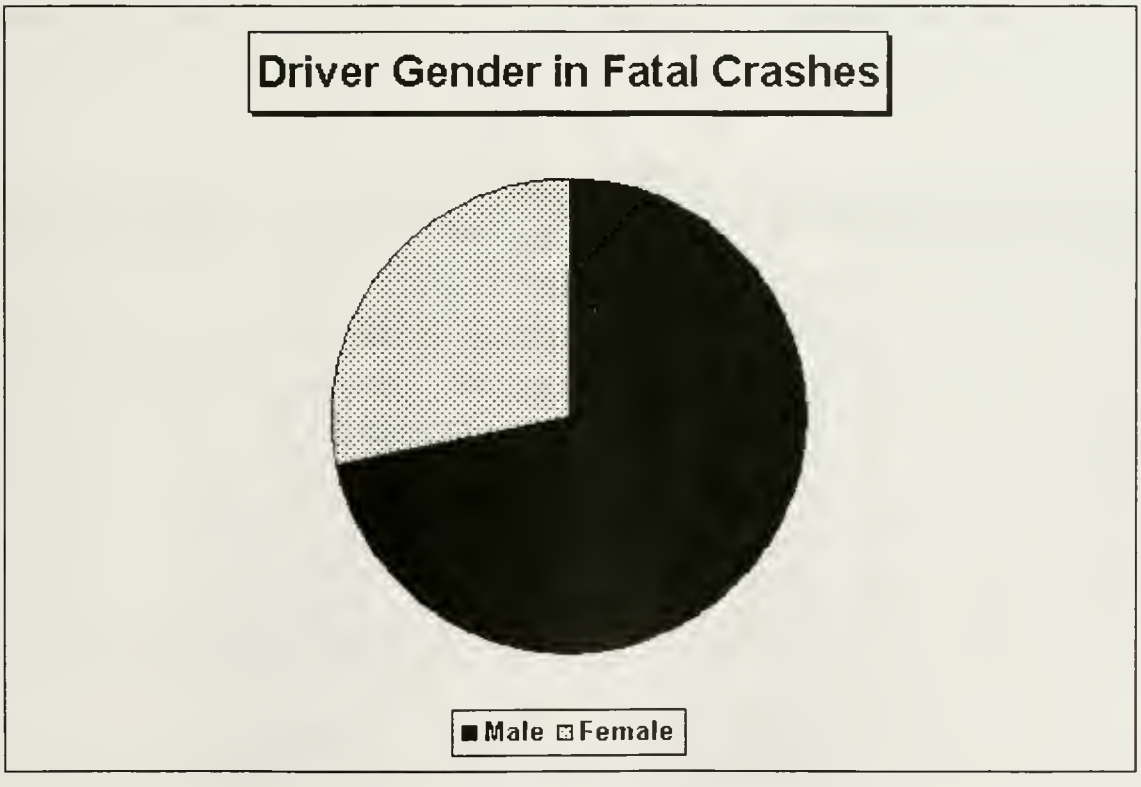
Year	Gender of Drivers			Percent of Total	
	Female	Male	Total	Female	Male
1997	74	218	292	25.3%	74.7%
1998	68	213	281	24.2%	75.8%
1999	78	187	265	29.4%	70.6%
2000	77	225	302	25.5%	74.5%
2001	63	213	276	22.8%	77.2%
2002	71	248	319	22.3%	77.7%
2003	96	236	332	28.9%	71.1%
2004	86	198	284	30.3%	69.7%
2005	70	231	301	23.3%	76.7%
2006	82	208	290	28.3%	71.7%
Chg 1 Year	+17.1%	-10.0%	-3.7%	+21.5%	-6.5%
Chg 5 Year	+6.2%	-7.6%	-4.1%	+10.9%	-3.7%

Source: TIS – Montana Department of Transportation

With the relatively small number of fatal crashes in Montana, the above percentages vary from year to year. During this ten-year period, approximately 75% of the drivers in these crashes are male. Figure 6 on the following page displays the ratio of drivers by gender involved in all crashes and fatal crashes during 2006.

Figure 6


Driver Gender in All Crashes
Male
Female


Driver Gender in Fatal Crashes
Male
Female

2. Gender and Age of Injuries

Injury involvement by gender is shown below in Table 12. During 1997, females for the first time in Montana sustained more injuries than males resulting from traffic crashes. This occurred again in 2001. There has been a slow and steady increase in vehicle miles traveled for women nationally over the past few decades. Men still account for about 60 to 75% of the fatalities.

Table 12
Injuries by Gender – 2006

Gender	Fatalities	Injuries
Male	171	4,854
Female	92	4,603

Source: TIS – Montana Department of Transportation

Table 13 shows injury numbers by age group for 2006. It should be noted that the injury numbers for the 15-19 age group are still very high.

Table 13
Injuries by Age – 2006

0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65-74	75+
204	213	350	1,769	1,345	1,510	1,272	1,312	774	380	315

Source: TIS – Montana Department of Transportation

The following table shows fatalities over time by age group. Fatalities were very high for the 45-54 year age group during 2006.

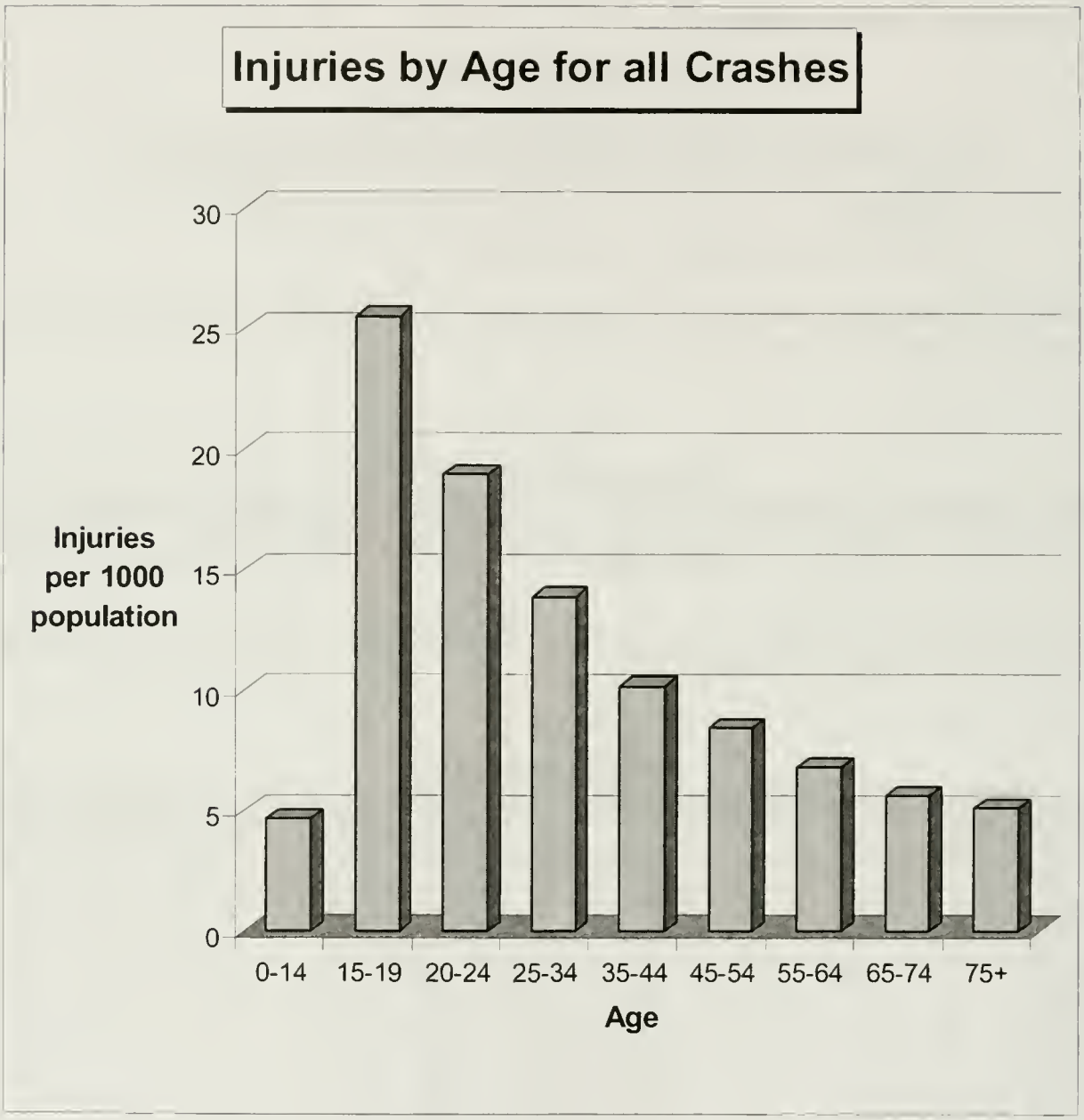
Table 14
Fatalities by Age

Year	0-4	5-14	15-19	20-24	25-34	35-44	45-54	55-64	65-74	75+
1997	7	6	35	31	38	42	42	20	18	24
1998	3	7	29	26	32	41	34	18	20	27
1999	1	8	39	28	30	34	31	19	11	17
2000	4	15	37	27	44	33	26	22	12	17
2001	1	13	16	32	38	39	38	26	13	14
2002	1	7	37	28	38	36	51	27	22	20
2003	4	9	36	37	34	34	42	27	17	22
2004	1	6	31	28	33	28	38	27	17	20
2005	5	6	22	31	52	32	31	34	18	20
2006	4	6	27	37	34	40	50	23	17	24
Ave	3.1	8.3	30.9	30.5	37.3	35.9	38.3	24.3	16.5	20.5

Source: TIS – Montana Department of Transportation

Figure 7 on the following page shows the rate of injuries per 1000 population by age. From this chart, it is quite evident from that greater danger exists for teens and young adults.

Figure 7


Injuries by Age for all Crashes
Injuries per 1000 population
30
25
20
15
10
5
0
0-14
15-19
20-24
25-34
35-44
45-54
55-64
65-74
75+
Age

3. Race

The population of Montana has little racial diversity. The 2000 census showed the following breakdown of population.

Table 15
Montanans by Race

Race	White	American Indian	Two or More Races	Other	Asian	Black	Hawaiian and Pacific Isl
Percent	90.6%	6.2%	1.7%	0.6%	0.5%	0.3%	0.1%

The two predominant races account for 96.8 percent of the population and are the only two that contain enough data to analyze. Fatality data from the Fatality Analysis Reporting System (FARS) is the only available crash information by race from 1999 to date. This data includes crashes occurring in Montana, which includes out of state drivers. Prior to 1999 data was kept for American Indians and for all other races.

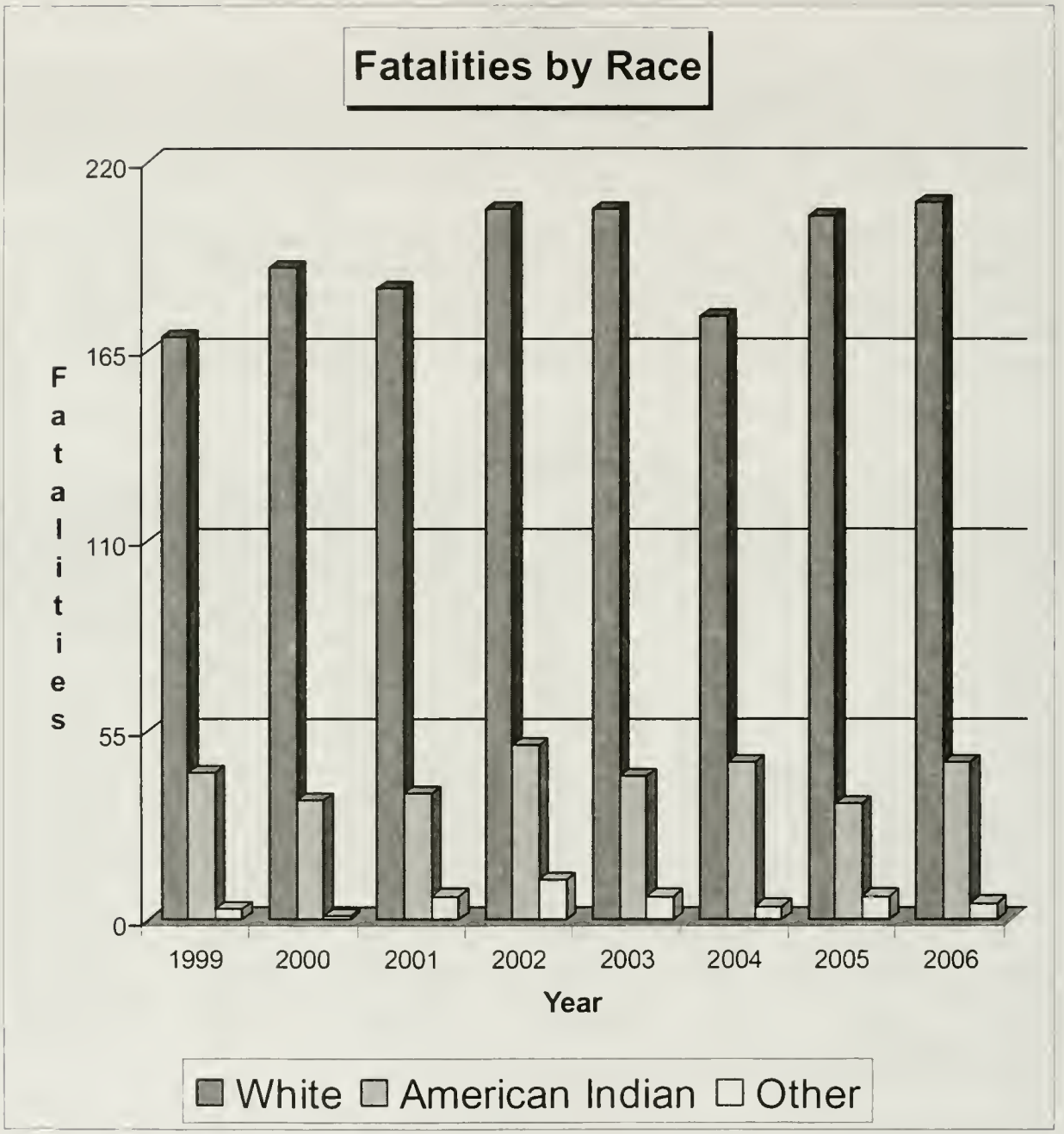
Table 16
Fatalities by Race

	Fatalities			Percentage of Total		
Year	White	American Indian	Other Races	White	American Indian	Other Races
1997	--	42	--	--	15.8%	--
1998	--	37	--	--	15.6%	--
1999	169	43	3	76.8%	19.5%	1.4%
2000	189	35	1	79.7%	14.8%	0.4%
2001	183	37	7	79.6%	16.1%	3.0%
2002	206	51	12	76.6%	18.9%	4.5%
2003	206	42	7	78.6%	16.0%	2.7%
2004	175	46	4	76.4%	20.1%	1.7%
2005	204	34	7	81.3%	13.5%	2.8%
2006	208	46	5	79.1%	17.5%	1.9%

Source: FARS Database – MDT
* Percentages do not add to 100% because there are usually 0-5% unknown

American Indian fatalities during each of the last ten years account for 13.5 to 20.1% of the total Montana fatalities, which is two to three times the percentage of the population. Alcohol related American Indian fatalities accounted for 26.3% of the total alcohol related fatalities during 2006. During the past four years seat belt usage for American Indian occupant fatalities has been less than 8%. Seat belt usage for all other race occupant fatalities has been just over 30%. Figure 8 displays the history of fatalities by race over the last few years.

Figure 8


Fatalities by Race
220
165
110
55
0
Fatalities
1999
2000
2001
2002
2003
2004
2005
2006
Year
White
American Indian
Other

4. Vehicle Type

National Data

There are major differences in severity of crashes depending on vehicle type. The rate of fatalities per 100,000 registered vehicles varies greatly. Nationally, during 2004, this rate for single vehicle fatal crashes per 100,000 vehicles is shown in Table 17.

A large portion of this difference is due to the chance of a rollover. NHTSA conducted a crash analysis of fatal crashes for different vehicle types during 2004.

Table 17
Vehicle Characteristics

Type of Vehicle	Fatality Rate in Rollovers (per 100,000 vehicles)	Fatality Rate in all Crashes (per 100,000 vehicles)
SUV's	9.29	15.07
Pickups	6.72	15.05
Passenger Cars	3.25	14.32
Minivans	3.45	11.09
Vans	4.04	9.34

Source: NHTSA

SUV's and pickups have a much higher propensity to rollover. The tendency in single vehicle crashes is for a driver to overcorrect when they first realize that they are in trouble. This overcorrection often leads to a rollover.

Over 44 percent of unrestrained fatal occupants are ejected from all types of vehicles as compared to only 6 percent of restrained fatal occupants according to 2003 National data. The risk of a fatal injury is many times higher if ejected than if not ejected. Fatally injured unrestrained occupants were ejected from the different types of vehicles as shown in Table 18.

Table 18
Ejection Rates for Unrestrained Fatal Occupants (2003)

Type of Vehicle	Ejection Rates
Passenger Cars	35%
SUV's	65%
Pickups	49%
Minivan	49%
Other Vans	49%

Source: NHTSA

Montana Data

As noted above, pickups and SUV's have a high susceptibility to rollover. Montana seat belt usage is much lower in pickups, which compounds the problem of rollovers. The following usage rates by vehicle type were obtained from a survey conducted during April 2006.

Table 19
Seat Belt Usage by Vehicle Type - 2006

Type of Vehicle	Usage Rate
Passenger Cars	81.0%
SUV's	81.2%
Pickups	62.9%
Vans *	60.0%

Source: Montana Department of Transportation
* sample size is statistically small (n=209)

There may be a perception by the public that most fatalities occur in multi-vehicle crashes involving head on and angle crashes. Many occupants of large vehicles perceive that they are safer and then decide not to wear their seat belt. In reality, 70% of fatal crashes in Montana are single vehicle crashes and 61% are road departure crashes. Single vehicle fatal crashes usually involve a rollover. It would appear that Montanan's must be educated about the rollover tendencies of vehicles and the importance of wearing belts in vehicles because of this risk of rollover and ejection.

There are many reasons why Montana has the one of the highest fatality rates in the nation in addition to a high incidence of impaired driving.

- A high percentage of driving is rural so that a high percentage of the vehicle miles traveled are at high speeds.
- A high percentage of registered vehicles in the state are pickups and these vehicles have higher fatality rates.
- Restraint use is significantly lower in pickups.
- A high percentage of pickup drivers are male, are more likely to be impaired and are more likely to drive aggressively.

As mentioned earlier, the Insurance Institute for Highway Safety published a paper in March 2006, entitled the "Use and Misuse of Motor Vehicle Crash Death Rates in Assessing Highway Safety Performance. **This paper concluded that most of the difference between states death rates comes from factors like urban versus rural vehicle miles driven**, along with demographics such as median household income, percentage of population ages 16-20, percentage of population with a college degree and school spending per pupil and not highway safety programs. The study concluded that a state like Montana has no chance to equal fatality rates of states like Massachusetts simply because of rural driving and demographics which account for 70% of the variation in fatality rates.

D. TRAFFIC SAFETY AREAS OF CONCERN

1. Impaired Driving

Alcohol/drug related crashes accounted for 10.1 percent of all reported traffic crashes during 2006. This percentage is higher than for all but one year since 1996, but is still far below the 22.3% of alcohol related crashes reported during 1983. This percentage has reached a plateau and appears to be increasing slightly.

Alcohol/drug related crashes tend to result in more severe injuries than do crashes with no impairment. During the early 1980's, injuries related to alcohol accounted for as much as 36% of the total. Last year, alcohol/drug related injuries were at 19.2% of all injuries. This is the highest percentage since 1994. Economic Loss from driver impairment crashes was over 193 million dollars during 2006. Table 20 below presents the impaired crash counts.

Table 20
Alcohol/Drug Related Crashes

Year	All Crashes			Injuries		
	Alcohol Related	All	Percent of All	Alcohol Related	All	Percent of All
1997	2,016	22,619	8.9%	1,818	10,688	17.0%
1998	2,142	22,068	9.7%	1,829	10,075	18.2%
1999	2,177	21,078	10.3%	1,771	10,459	16.9%
2000	2,211	22,254	9.9%	1,824	10,798	16.9%
2001	2,035	21,846	9.3%	1,652	8,982	18.4%
2002	2,288	23,527	9.7%	1,745	10,086	17.3%
2003	2,173	23,160	9.4%	1,638	9,632	17.0%
2004	2,113	21,783	9.7%	1,767	9,263	19.1%
2005	2,182	22,373	9.8%	1,623	9,211	17.6%
2006	2,243	22,186	10.1%	1,816	9,470	19.2%
Chg 1 Year	+2.8%	-0.8%	+3.1%	+11.9%	+2.8%	+9.1%
Chg 5 Year	+3.9%	-1.6%	+5.4%	+7.8%	+0.4%	+7.4%

Source: TIS - Montana Department of Transportation

The National Highway Traffic Safety Administration (NHTSA) has moved away from placing emphasis on the percentage of fatalities that are alcohol related. NHTSA is now

emphasizing the alcohol related fatality rate when comparing states. This rate is acquired by dividing the number of alcohol related traffic fatalities by the number vehicle miles traveled. This data is compiled by NHTSA through the use of the Fatal Analysis Reporting System (FARS) database and state vehicle miles traveled estimates.

The FARS database inputs the results of BAC tests from the Montana Forensics Lab. If no test is performed or received, the alcohol code is generated using a number of other crash factors through a mathematical procedure. The FARS data is the most accurate data available because it is usually based upon BAC results. Timeliness is a problem with the FARS data since results from NHTSA are usually not available for over 12 months after the end of a year. The data in Table 21 is based upon FARS data, while most of the other data related to alcohol in this section is derived from the MHP crash records database. The MHP data is based upon perceptions and evidence at the scene along with on scene testing.

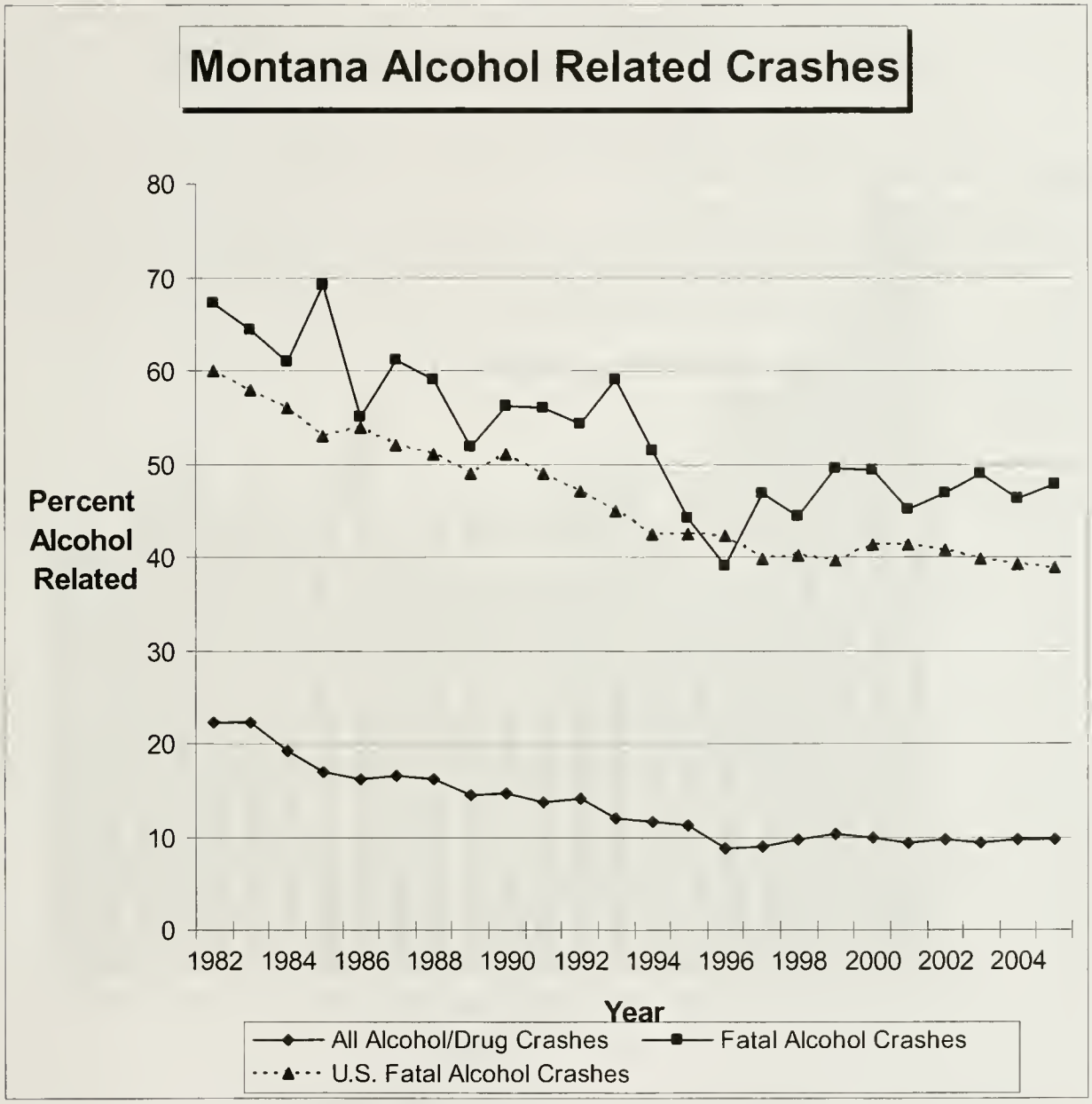
Table 21
Alcohol Fatalities & Fatality Rates

Year	Total Fatalities	Alcohol Related Fatalities	Alcohol Related Percent	Total Fatality Rate	Alcohol Related Fatality Rate
1996	200	78	39.0%	2.10	0.83
1997	265	124	46.8%	2.84	1.32
1998	237	105	44.3%	2.50	1.10
1999	220	109	49.5%	2.25	1.11
2000	237	117	49.4%	2.40	1.18
2001	230	104	45.2%	2.30	1.04
2002	269	126	46.8%	2.57	1.20
2003	262	128	48.9%	2.40	1.17
2004	229	106	46.3%	2.04	0.95
2005	251	124	49.4%	2.26	1.12
Chg 1 Year	+9.6%	+17.0%	+6.7%	+10.8%	+17.9%
Chg 5 Year	+2.3%	+6.7%	+4.4%	-3.5%	+1.1%

Source: Fatal Analysis Reporting System

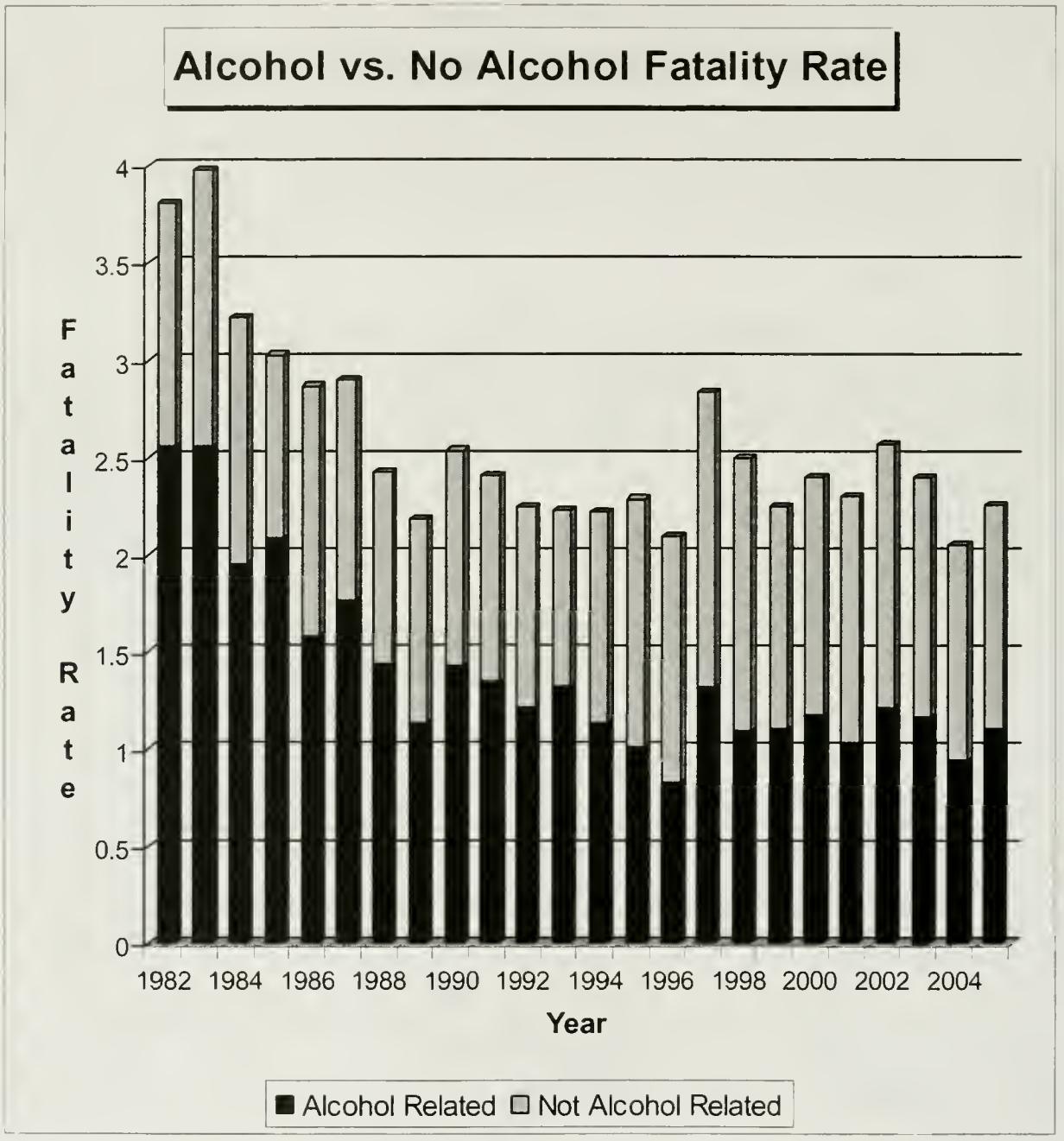
Figure 9 on the following page compares the Montana percentage of alcohol related crashes with the national percentage. The graph in Figure 10 displays alcohol and non-alcohol fatality rates in Montana since 1982. The alcohol fatality rate during 2004 was the lowest since 1996. The final rate during 2005 was higher at 1.11.

Figure 9



Source: Montana Department of Transportation and NHTSA

Figure 10


Alcohol vs. No Alcohol Fatality Rate
Fatality Rate
4
3.5
3
2.5
2
1.5
1
0.5
0
1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004
Year
Alcohol Related
Not Alcohol Related

The Montana fatality rate during 1983 was 3.98 and the alcohol related fatality rate that year was 2.56. During the past twenty-two years, the alcohol rate has decreased more than 50%. The lowest rate was reached in 1996 and during the last ten years the rate has been nearly level. The current alcohol related fatality rate for the nation is 0.56 and for Montana the rate is 1.11.

Next, we examine alcohol related crashes by county. The final column of Table 22 displays the percentage of crashes with alcohol/drug involvement in the county. There is a tendency for the larger urban counties to have a lower percentage of alcohol involvement in crashes. It is not known whether this implies counties with higher populations truly have less alcohol involvement because of alcohol education and related activities, or whether the large number of fender benders at intersections makes the percentage of alcohol involvement lower. It is felt that these lower percentages result from a combination of these and possibly other factors. In addition, there are some enforcement agencies, which are not as precise in determining alcohol related involvement, which may cause some counties to show low percentages.

Table 22

Alcohol/Drug Related Crashes by County (2006)

County	Total Crashes	Fatal Crashes	Fatalities	Injuries	Percent Alcohol/Drug Crashes
Beaverhead	25	2	2	25	15.3%
Big Horn	33	6	6	35	19.6%
Blaine	11	0	0	23	25.0%
Broadwater	12	0	0	19	9.7%
Carbon	33	1	1	25	14.0%
Carter	1	0	0	1	11.1%
Cascade	178	5	6	119	8.5%
Chouteau	9	1	1	12	11.8%
Custer	18	1	1	6	7.6%
Daniels	2	0	0	1	10.0%
Dawson	20	0	0	20	9.1%
Deer Lodge	12	0	0	11	11.0%
Fallon	6	0	0	1	14.6%
Fergus	20	1	1	12	8.0%
Flathead	250	12	13	229	11.8%
Gallatin	156	6	8	98	8.1%
Garfield	2	0	0	3	25.0%
Glacier	42	5	5	66	22.7%
Golden Valley	5	0	0	3	20.8%
Granite	9	0	0	11	9.6%
Hill	42	1	1	26	13.3%
Jefferson	34	2	2	30	9.0%
Judith Basin	6	0	0	4	12.5%
Lake	102	8	10	109	18.9%
Lewis & Clark	124	3	4	85	7.1%
Liberty	1	0	0	0	10.0%
Lincoln	32	0	0	44	10.4%
Madison	21	2	2	11	11.1%
McCone	2	0	0	3	10.5%
Meagher	4	0	0	1	9.1%
Mineral	11	1	1	14	3.7%
Missoula	229	6	7	170	10.2%
Musselshell	8	1	1	9	10.7%
Park	34	2	2	14	9.6%
Petroleum	1	0	0	0	10.0%
Phillips	7	1	1	8	8.8%
Pondera	6	1	1	11	7.3%

Table 22 (continued)

Alcohol/Drug Related Crashes by County

County	Total Crashes	Fatal Crashes	Fatalities	Injuries	Percent Alcohol/Drug Related Crashes
Powder River	4	1	1	4	10.8%
Powell	10	1	1	10	5.6%
Prairie	4	1	1	4	8.5%
Ravalli	58	3	3	41	8.2%
Richland	32	3	3	23	12.5%
Roosevelt	25	2	2	45	23.1%
Rosebud	11	0	0	8	7.3%
Sanders	38	1	1	44	18.2%
Sheridan	6	0	0	5	10.9%
Silver Bow	56	2	2	34	7.5%
Stillwater	23	0	0	18	11.0%
Sweet Grass	16	1	1	10	13.8%
Teton	7	0	0	2	5.8%
Toole	14	0	0	10	15.4%
Treasure	3	0	0	4	7.9%
Valley	17	2	2	16	13.3%
Wheatland	9	0	0	3	18.8%
Wibaux	5	1	1	4	14.3%
Yellowstone	397	13	14	272	10.6%
Total	2,243	99	108	1,816	10.1%

Source: TIS -- Montana Department of Transportation

Complete DUI arrest data is not summarized by any agency in Montana. Not all arrests result in a conviction for DUI, since some are dismissed or not prosecuted and others are found not guilty. In lieu of arrest data for Montana, we now present conviction data, which is gathered by the Department of Justice and placed upon driver's records. This data includes out-of-state convictions for Montana licensed drivers. Total Convictions reported were higher during 2006 than the previous four years.

Table 23
Alcohol Related Convictions
(Reported to Records and Driver Control Bureau - DOJ)

Year	2002	2003	2004	2005	2006
DUI 1st Offense	2823	2790	3009	2832	3250
DUI 2nd or Subsequent Offense	834	1010	909	967	1055
BAC 1st Offense	1215	1249	1395	1698	1722
BAC 2nd or Subsequent Offense	213	204	174	179	247
0.02% BAC (Under 21) 1st Offense	460	438	429	361	415
0.02% BAC (Under 21) 2nd or Subsequent Offense	9	6	23	33	25
Felony DUI	210	209	258	286	217
Total	**5764**	**5906**	**6197**	**6356**	**6931**
Implied Consent	1146	1149	1073	1171	1083
P.A.S.T.	1092	1208	1213	1243	1330

Source: Montana Department of Justice – Records and Driver Control Bureau

Next, data is usually presented for DUI convictions by county and by type of arresting agency. Unfortunately, the Department of Justice is redesigning the databases in the department including the conviction system. While the database has been redesigned, the software for accessing certain types of data is not complete. Because of this, no data by county is available this year, but improved reporting capabilities should exist for the 2009 calendar year.

Table 24 examines the age of the drivers that are involved in alcohol related traffic crashes. Crash rates per licensed driver are calculated. This information can help those in the traffic safety community make decisions on targeting specific age groups concerning the drinking and driving problem. It should be noted that not all drivers involved in these alcohol crashes were drinking. While most alcohol crashes are single car crashes, when there are multiple vehicles involved (792 crashes), some of the drivers may have been not drinking.

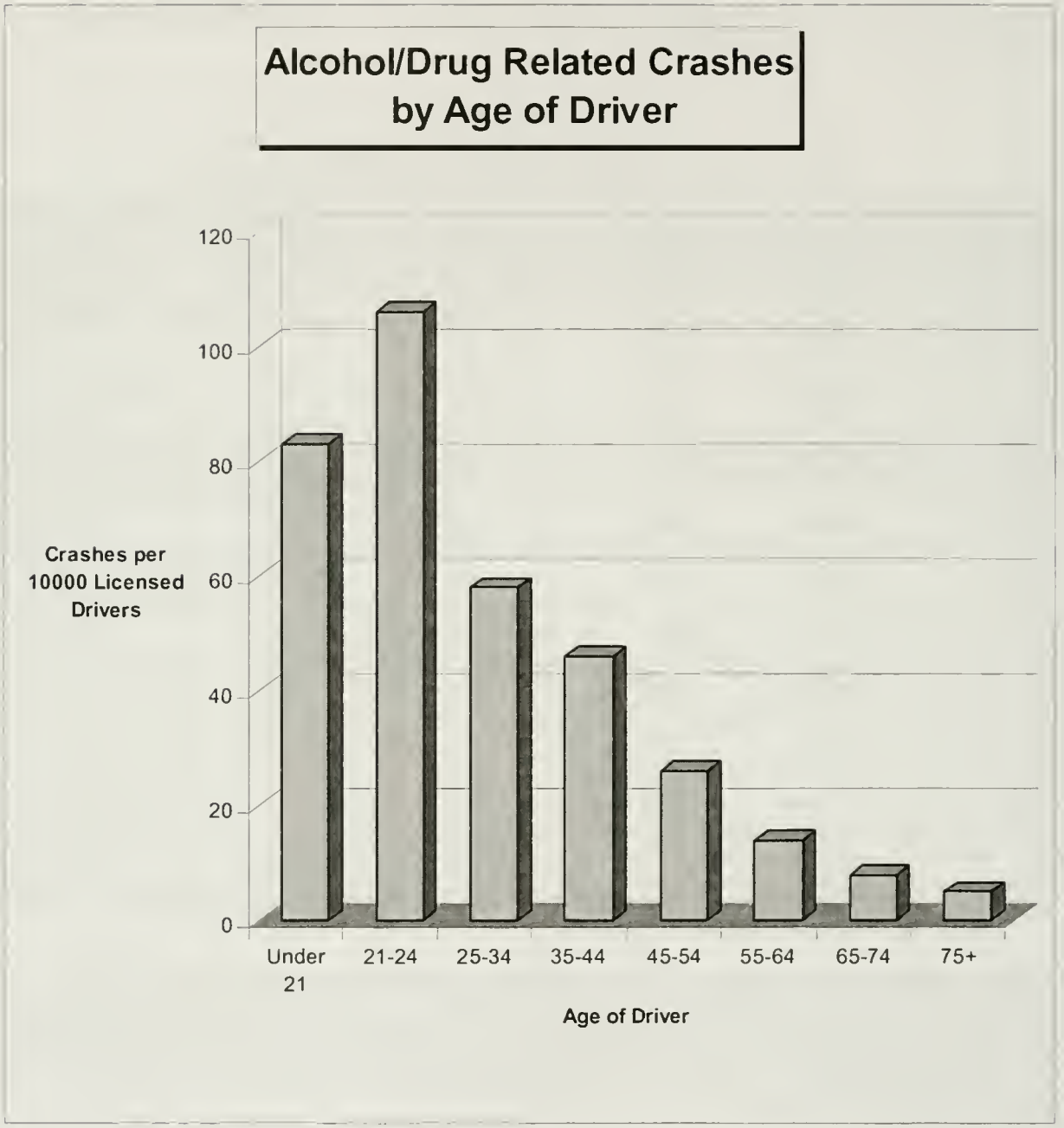
Table 24
Alcohol Related Crashes by Age of Driver
(2006 Crash Data)

Age	Licensed Drivers (FY2006)	Drivers in Alcohol Crashes	Alcohol Crashes per 10,000 Licenses	Drivers in Fatal Alcohol Crashes	Fatal Alcohol Crashes per 10,000 Licenses
Under 18	23,768	121	51	3	1.3
18-20	35,628	370	104	16	4.5
Under 21	59,396	491	83	19	3.2
21-24	48,336	511	106	21	4.3
25-34	116,636	676	58	30	2.6
35-44	117,831	540	46	20	1.7
45-54	149,926	384	26	23	1.5
55-64	118,495	170	14	8	0.7
65-74	67,847	57	8	1	0.1
75+	45,509	23	5	0	0.0

Source: TIS – Montana Department of Transportation, FARS – Montana Department of Transportation, Motor Vehicle Division – Department of Justice

The highest involved age group for alcohol related crashes was 21-24 years of age. The group between 18 and 20 is a very close second. For fatal crashes, the highest rate is for 18-20 followed by 21-24. Figure 11 on the next page shows these rates by age. It is interesting to compare this chart with Figure 18 on page 67, which shows rates by age for all crashes.

Figure 11


Alcohol/Drug Related Crashes by Age of Driver
Crashes per 10000 Licensed Drivers
120
100
80
60
40
20
0
Under 21
21-24
25-34
35-44
45-54
55-64
65-74
75+
Age of Driver

The table below examines "drivers" under age 21 involved in crashes. Those drivers involved in all crashes and in alcohol/drug related crashes are compared. It should be emphasized that the counts are for drivers of age 20 and under (not crashes). There could be a few instances where the young driver had not been drinking, while another older driver involved in the crash had been drinking. Fortunately, most alcohol/drug related crashes involve only one vehicle.

Underage drivers have a lower use of involvement in alcohol/drug related crashes than the entire population of drivers. When young drivers are involved in crashes, 6.9% of those crashes involve alcohol and/or drugs, while the rate is 10.1% for all drivers regardless of age.

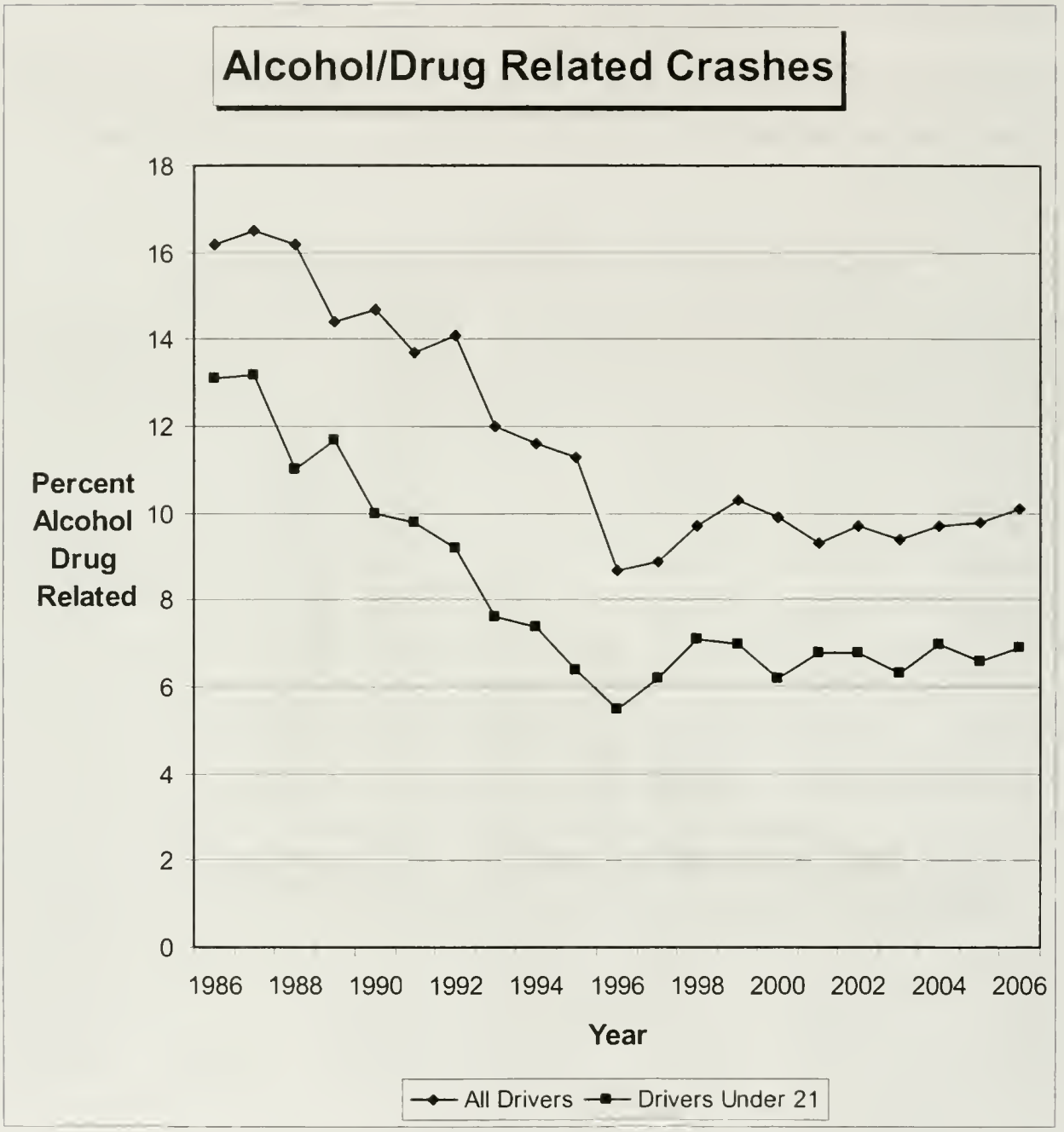
Table 25
Drivers Under 21 – Alcohol/Drug Related Crashes

Year	Young Drivers in All Crashes			Young Drivers In Fatal Crashes		
	Alcohol Related	All	Percent of All	Alcohol Related	All	Percent of All
1997	491	7,958	6.2%	19	47	40.4%
1998	534	7,503	7.1%	14	44	31.8%
1999	497	7,064	7.0%	23	55	41.8%
2000	497	7,969	6.2%	13	49	26.5%
2001	531	7,781	6.8%	13	40	32.5%
2002	558	8,224	6.8%	16	47	34.0%
2003	473	7,551	6.3%	18	57	31.6%
2004	499	7,090	7.0%	17	39	43.6%
2005	468	7,096	6.6%	11	37	29.7%
2006	491	7,080	6.9%	19	37	51.4%
Chg 1 Yr	+4.9%	-0.2%	+4.5%	+72.7%	---	+73.1%
Chg 5 Yr	-2.9%	-6.2%	+3.0%	+26.7%	-15.9%	+49.9%

Source: TIS – Montana Department of Transportation

Figure 12 on the following page examines these trends over time. A general decline for percentage of alcohol/drug related crashes occurred until 1995. From 1996 until 2006, this percentage appears to be increasing slightly.

Figure 12


Alcohol/Drug Related Crashes
Percent Alcohol Drug Related
18
16
14
12
10
8
6
4
2
0
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
Year
All Drivers
Drivers Under 21

2. Occupant Protection

Montana's seat belt law became effective on October 1, 1987, without penalties. A penalty was collected beginning January 1, 1988. The law was written for secondary law enforcement and covered all seating positions within vehicles. Although, there must be another reason for stopping a vehicle, the law has been effective. Montana is one of only fourteen states where all seating positions are covered. Only three standard enforcement states cover all positions. A bill for standard enforcement had been introduced to the Montana legislature during four sessions and did not make it out of committee during the first two attempts. During the 2005 legislative session, a bill passed the Senate and was within nine votes of passing the House. During the 2007 session a bill again passed the Senate and was defeated in the House by a vote of 55-45. Passage of standard enforcement will usually raise seat belt usage from 8 to 12 percentage points.

Montana's restraint usage rates are shown on the next page in Table 26. These rates are acquired using an approved NHTSA observational survey. The survey is conducted each year during June at 120 randomly selected locations statewide.

Montana restraint usage increased from 16.8% in 1984 to 33.3% by October 1987 before the mandatory seat belt bill became law. This gain was acquired by conducting seat belt incentive give away campaigns in many of Montana's cities along with public information programs. When the enforcement of the law began, usage jumped to 56% and has gradually increased since that time, with the exception of the 2005 and 2006 survey years. The current level of usage is 79.6%. While each yearly decline was not statistically significant, the two year decline is marginally significant.

Usage is usually two to three percentage points higher in summer than in winter, spring and fall on Montana roadways. This cycle is likely caused by a greater percentage of short trips during the winter. Tourists are more prevalent in the summer, which accounts for a larger percentage of long trips and likely higher usage. In addition, families traveling together tend to have higher usage than when there is just one person in the vehicle. A higher percentage of vehicles contain more than one person during the summer in Montana.

Table 26
Seat Belt Usage Rates

Year	Interstate	Primary	City	Other	All Roads
1984	24.7%	20.7%	8.4%	8.4%	16.8%
1986	43.4%	33.9%	14.8%	17.1%	29.5%
1987	54.8%	44.0%	24.0%	27.0%	39.7%
1988	75.8%	64.7%	41.2%	45.6%	59.5%
1989	78.6%	69.3%	40.6%	47.5%	61.8%
1990	79.1%	70.5%	40.2%	48.4%	62.6%
1991	80.9%	72.8%	41.4%	49.3%	64.5%
1992	83.1%	75.3%	47.8%	53.7%	68.0%
1993	84.2%	75.9%	49.6%	56.2%	69.2%
1994	84.7%	75.4%	51.1%	56.4%	69.6%
1995	86.4%	75.0%	51.3%	57.5%	70.1%
1996	86.2%	75.5%	51.8%	61.0%	70.8%
1997	87.9%	79.3%	52.4%	60.2%	72.6%
1998	88.4%	78.2%	54.0%	63.5%	73.1%
1999	89.1%	78.9%	55.3%	65.0%	74.0%
2000	91.3%	79.5%	58.3%	65.5%	75.6%
2001	92.5%	79.6%	59.7%	65.7%	76.3%
2002	94.3%	82.5%	60.8%	69.7%	78.4%
2003	93.6%	82.3%	65.1%	71.7%	79.5%
2004	93.0%	83.3%	67.7%	73.1%	80.9%
2005	92.6%	82.4%	66.9%	72.6%	80.0%
2006	92.6%	81.7%	64.9%	70.6%	79.0%
2007	92.2%	82.1%	67.4%	70.5%	79.6%
Chg 1 Year	-0.4%	+0.5%	+3.9%	-0.1%	+0.8%
Chg 5 Year	-1.1%	-0.4%	+3.6%	-1.5%	+0.1%

Source: State Highway Traffic Safety Bureau – Montana Department of Transportation

On the following page, Figure 13 shows a graph of Montana's seat belt usage since 1983.

Figure 13

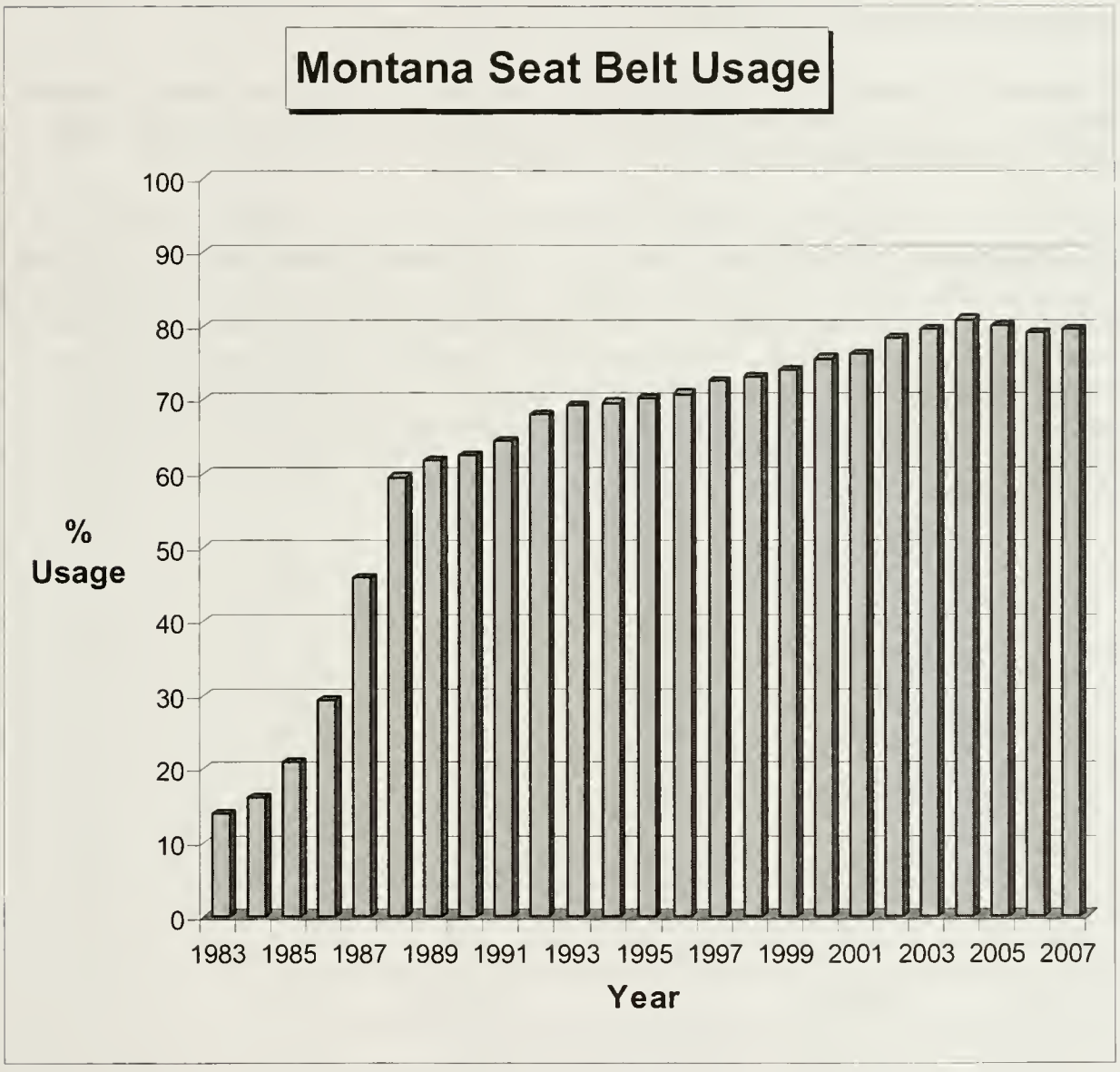

Montana Seat Belt Usage
100
90
80
70
60
50
40
30
20
10
0
% Usage
1983 1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005 2007
Year

Table 27 on the following page displays seat belt convictions by arresting agency. Over 13,500 convictions resulted from seat belt citations issued during 2006. This is slightly less than the convictions, which resulted from 2005 citations.

The Montana Highway Patrol wrote over 67% of the convictions statewide, which was a decrease from 2005. Police departments accounted for over 26% of statewide citations, up somewhat from 2005. Sheriff departments wrote citations that resulted in convictions which made up about 6% of the statewide total.

Many smaller local enforcement agencies, do not write significant numbers of seat belt citations. Usage may be lower on local streets and county roads since not as many citations are written and because of a lower perceived risk of a serious crash.

The number of convictions resulting from citations written by sheriff departments has increased during the past fifteen years. In the past, Missoula and Silver Bow counties accounted for over 90% of these convictions. Several additional counties are beginning to write some seat belt citations, so that Missoula and Silver Bow accounted for 69% of the convictions during 2006. The Bureau of Indian Affairs and/or Tribal Police issue very few citations that result in convictions reported to the Montana Department of Justice. However, many citations from reservations are likely not sent to the Department of Justice so actual numbers are unknown. Restraint usage on most of Montana's reservations continues to be quite low.

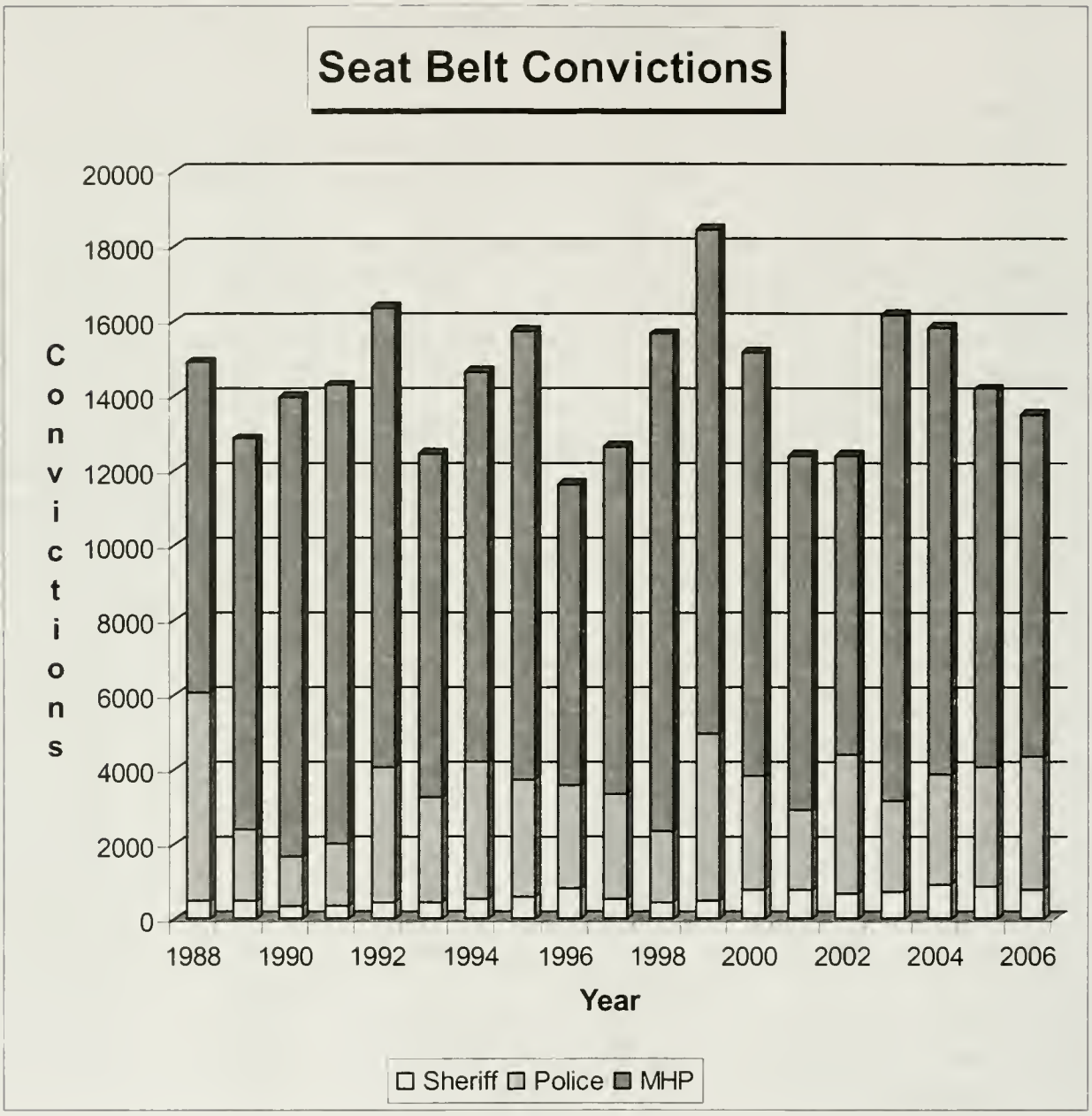
Table 27
Seat Belt Convictions by Agency Issuing Citation

Year	Police	Sheriff	MHP	Reservation Law Enf.	Total
1988	5,612	478	8,818	0	14,908
1989	1,907	483	10,463	0	12,853
1990	1,316	379	12,277	0	13,972
1991	1,658	355	12,269	15	14,297
1992	3,611	453	12,283	62	16,409
1993	2,799	474	9,192	106	12,571
1994	3,654	546	10,445	70	14,715
1995	3,173	585	11,986	38	15,782
1996	2,784	816	8,055	5	11,660
1997	2,798	567	9,289	11	12,665
1998	1,911	461	13,293	75	15,740
1999	4,454	521	13,459	32	18,466
2000	3,027	792	11,344	30	15,193
2001	2,141	786	9,463	9	12,399
2002	3,686	702	8,026	11	12,425
2003	2,422	724	13,022	2	16,170
2004	2,944	927	11,943	3	15,817
2005	3,192	889	10,112	2	14,195
2006	3,557	793	9,146	10	13,506
Chg 1 Year	+11.4%	-10.8%	-9.6%	+400%	-4.9%
Chg 5 Year	+23.6%	-1.6%	-13.0%	+85.2%	-4.9%

Source: Montana Department of Transportation

Figure 14 on the next page shows convictions during the nineteen years of the law.

Figure 14


Seat Belt Convictions
Convictions
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
Year
Sheriff
Police
MHP

Restraint usage acquired from crash reports is analyzed next. Usage as reported by the investigating officer is quite accurate in the case of fatalities. Even if the person is no longer in the vehicle, physical evidence usually allows the correct coding of this information. For persons injured in crashes, accurate coding of this field becomes more difficult. Generally, the investigating officer must rely on the honesty of the occupants when acquiring this data. The following table displays restraint use for occupant fatalities. Restraint usage is much lower for fatalities than for the overall population. There are thought to be two reasons for this. The first is that people that drive in a manner that tends to result in fatalities, are often under the influence of alcohol and/or drugs, are speeding or are involved in other hazardous driving. It has been shown in studies that these occupants tend to use restraints much less often—risk takers tend to be risk takers in many life choices. The second factor is that the occupants in crashes without belts are much more likely to die than those occupants wearing belts.

Table 28
Restraint Use for Occupant Fatalities in Crashes
(Excludes, Pedestrians, Bicyclists, Motorcyclists, ATV's, farm machinery, etc.)

Year	Not Belted	Belted	Unknown	Total Occupants	Percent Belted
1997	160	65	9	234	27.8%
1998	134	59	10	203	29.1%
1999	148	41	6	195	21.0%
2000	126	64	11	201	31.8%
2001	141	57	6	204	27.9%
2002	166	54	8	228	23.7%
2003	161	65	7	233	27.9%
2004	135	48	8	191	25.1%
2005	148	50	5	203	24.6%
2006	149	64	6	219	29.2%
Chg 1 Year	+0.7%	+28.0%	+20.0%	+7.9%	+18.7%
Chg 5 Year	-0.8%	+16.8%	-11.8%	+3.4%	+13.0%

Source: Fatal Analysis Reporting System (FARS)

Only about 25-30% of occupants killed in crashes were properly wearing an occupant restraint. Of the remaining 70-75%, NHTSA estimates that half could be saved if wearing a restraint. Note that the total fatalities shown in this table is not the same as in other tables throughout this paper. This table only shows occupant fatalities and does

not include, motorcyclists, pedestrians, bicyclists or other unusual vehicles such as farm machinery, ATV's, etc.

Next is presented seat belt usage by vehicle type for occupant fatalities for crashes within Montana. Data is shown for crashes occurring during 2004 through 2006. Usage was much lower for pickups than for other types of vehicles.

Table 29
Seat Belt Usage of fatalities by Vehicle Type (2004-2006)

Vehicle Type	Usage
Pickups	16.0%
Passenger Cars	32.1%
SUV's	29.0%
Minivans	50.0%

Source: Fatal Analysis Reporting System (FARS)

In Table 30, it is shown that seat belt use is much lower (about one-half) in crashes that are alcohol related than for those without alcohol involvement. Use in crashes without alcohol and drug involvement is 37.6% compared to 18.1% in those with alcohol and drugs.

Table 30
Seat Belt Usage versus Alcohol Involvement Fatal Crashes – 2006

		Seat Belt Used	Seat Belt Not Used	Unknown	Total
Alcohol Related	Fatalities	17	74	3	94
	Percent	18.1%	78.7%	3.1%	100.0%
Not Alcohol Related	Fatalities	47	75	3	100
	Percent	37.6%	60.0%	2.4%	100.0%
Total	Fatalities	64	149	6	219

Source: Fatal Analysis Reporting System (FARS)

The next table shows restraint usage for injured occupants in crashes. The usage in this table is much higher than that reported in the fatality table. This is due to three things: 1) occupants in injury crashes are not as likely to be involved in speeding, driving under the influence and hazardous driving actions and also tend to wear restraints more often, 2) Some of these occupants are not telling the truth about restraint usage and 3) survivors often survive simply because they were belted. Occupant usage for uninjured occupants is even higher and is usually above the observed average statewide usage.

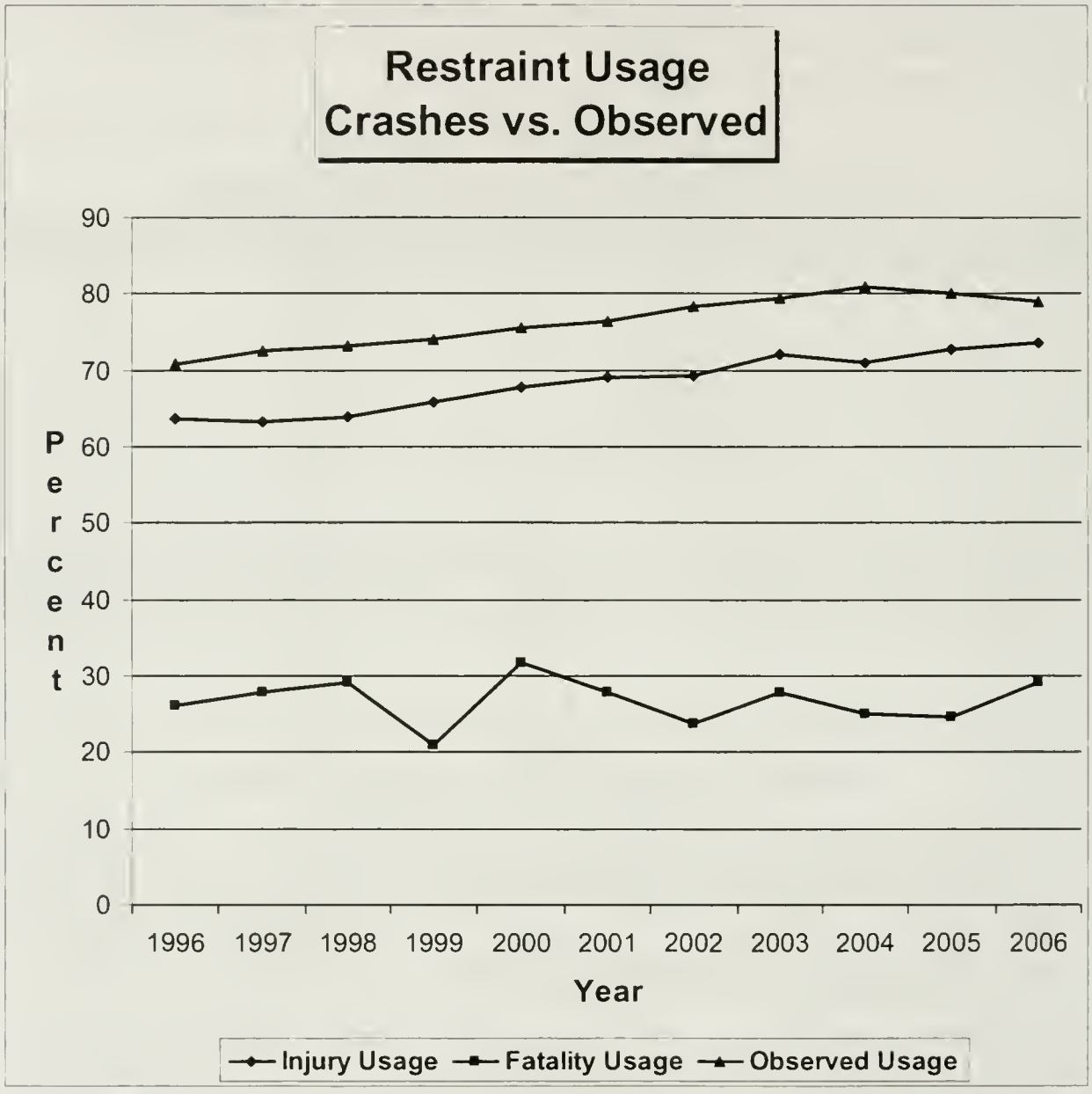
Table 31
Restraint Use for Occupant Injuries in Crashes

Year	Not Belted	Belted	Total Occupants	Percent Belted
1997	3,164	5,449	8,613	63.3%
1998	2,954	5,195	8,149	63.8%
1999	2,899	5,566	8,465	65.8%
2000	2,814	5,910	8,724	67.7%
2001	2,203	4,929	7,132	69.1%
2002	2,462	5,561	8,023	69.3%
2003	2,182	5,651	7,833	72.1%
2004	2,264	5,551	7,815	71.0%
2005	2,121	5,650	7,771	72.7%
2006	2,123	5,915	8,038	73.6%
Chg 1 Year	+0.1%	+4.7%	+3.4%	+1.2%
Chg 5 Year	-5.5%	+8.2%	+4.2%	+3.9%

Source: TIS - Montana Department of Transportation

This usage has been increasing during the past eleven years. The amount of increase seems to be similar to the state usage survey increases. Figure 15 on the following page shows usage from the previous two tables along with annual observed usage in Montana. The injury usage from crash reports seems to track about six to nine percent below the observed usage.

Figure 15


Restraint Usage
Crashes vs. Observed
90
80
70
60
50
40
30
20
10
0
Percent
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
Year
Injury Usage
Fatality Usage
Observed Usage

Fatalities and injuries to motor vehicle passengers whose ages are fourteen and under are of interest in relation to child safety and child restraint usage. The following table displays the history of occupant injury data over the last ten years. Injuries generally decreased from 1996 to 2006. Fatalities for the 5 to 14 year group seem to be decreasing and are well below the 2000 and 2001 numbers.

Table 32
Injuries – Age Fourteen and Under
(excludes pedestrians and bicyclists)

Year	Fatalities		Injuries	
	0-4	5-14	0-4	5-14
1997	6	6	312	668
1998	3	7	278	626
1999	1	5	275	652
2000	4	10	242	693
2001	1	13	207	475
2002	1	6	220	593
2003	4	8	231	593
2004	1	4	210	562
2005	4	5	221	521
2006	4	4	199	496
Change 1 Year	---	-20.0%	-10.0%	-4.8%
Change 5 Year	+81.8%	-44.4%	-8.6%	-9.6%

Source: TIS - Montana Department of Transportation

Restraint usage by age cannot be determined from the observational survey. We can analyze belt use data in crashes and acquire a general idea of how usage in Montana varies by age. While the actual usage rate is not accurate, the variation by age would be expected to be similar to actual use. In order to show significance, crash information for the last three years was analyzed (2004 – 2006). Usage is shown on the following page in Figure 16.

The age group with the lowest usage is from age 20 to 24, but all ages from 10-39 have relatively low usage rates. The age groups of 55 and above have higher usage along with 0 to 4 year olds.

Figure 16

Restraint Use by Occupant Age for Fatal and Incapacitating Injuries (2004-2006)
Percent Use
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 4
5 - 9
10 - 14
15 - 19
20 - 24
25 - 29
30 - 34
35 - 39
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
75 - 79
80 - 84
85+
Age

3. Hazardous Actions, Speed and License Compliance

a. Speed and Driver Contributing Circumstances

The current speed limits became law on Memorial Day weekend of 1999. The limit on the interstate was set at 75, while the limit on most other non-interstate routes was set at 70 mile per hour. Night speeds are 75 on the interstate and 65 on non-interstate routes. Trucks have limits that are slower on many roads.

There is a correlation between alcohol related fatalities and exceeding the speed limit as shown in the table below. Vehicles were speeding for 58.3% of alcohol related fatalities and in only 30.4% of the non-alcohol related fatalities.

Table 33
Speed versus Alcohol Involvement
Fatalities – 2006

		Speeding	Not Speeding	Total
Alcohol Related	Fatalities	67	48	115
	Percent	58.3%	41.7%	100.0%
Not Alcohol Related	Fatalities	45	103	148
	Percent	30.4%	69.6%	100.0%
Total		112	151	263

Source: Fatal Analysis Reporting System (FARS)

Characteristics recorded about the driver and his or her actions leading up to crashes are now examined. Inattentive Driving is the major contributing circumstance in crashes. Inattentive driving is an overall category for not concentrating on the task of driving and is very subjective as determined by the investigating officer. It is apparent that many drivers are doing other things in their car besides driving---such as eating, smoking, talking on cell phones, adjusting vehicle controls, inserting tapes or CD's, looking at GPS mapping, along with many other non-driving activities. There are more possible distractions in our busy and electronic world and many of these seem to be taking a priority over actually operating a car. Cell phone use was admitted to as a contributor in 138 crashes and was likely a distraction in many more. This number is increasing on a yearly basis as shown in Table 34.

Table 34
Inattentive Driving and Distractions

Year	Inattentive Driving	Fell Asleep	Cell Phone
1997	7,422	507	--
1998	7,051	531	--
1999	7,106	594	--
2000	7,326	547	--
2001	7,290	499	--
2002	7,768	542	62
2003	7,380	564	62
2004	7,148	573	78
2005	7,285	522	101
2006	7,406	555	138
Change 1 Year	+1.7%	+6.3%	+36.6%
Change 5 Year	+0.4%	+2.8%	---

The most common contributing circumstances involving drivers in crashes, as determined by the investigating officer, are summarized in Table 35. The number of times that careless driving was noted has increased over the last few years. During 1996, crash investigators decided that careless driving was one of the contributors to the crash in 3,924 instances, while it was a contributor in over 5,800 instances for each year since 2002. Following too closely is also beginning to show an upward trend, while Improper Turn and Improper backing are trending downward.

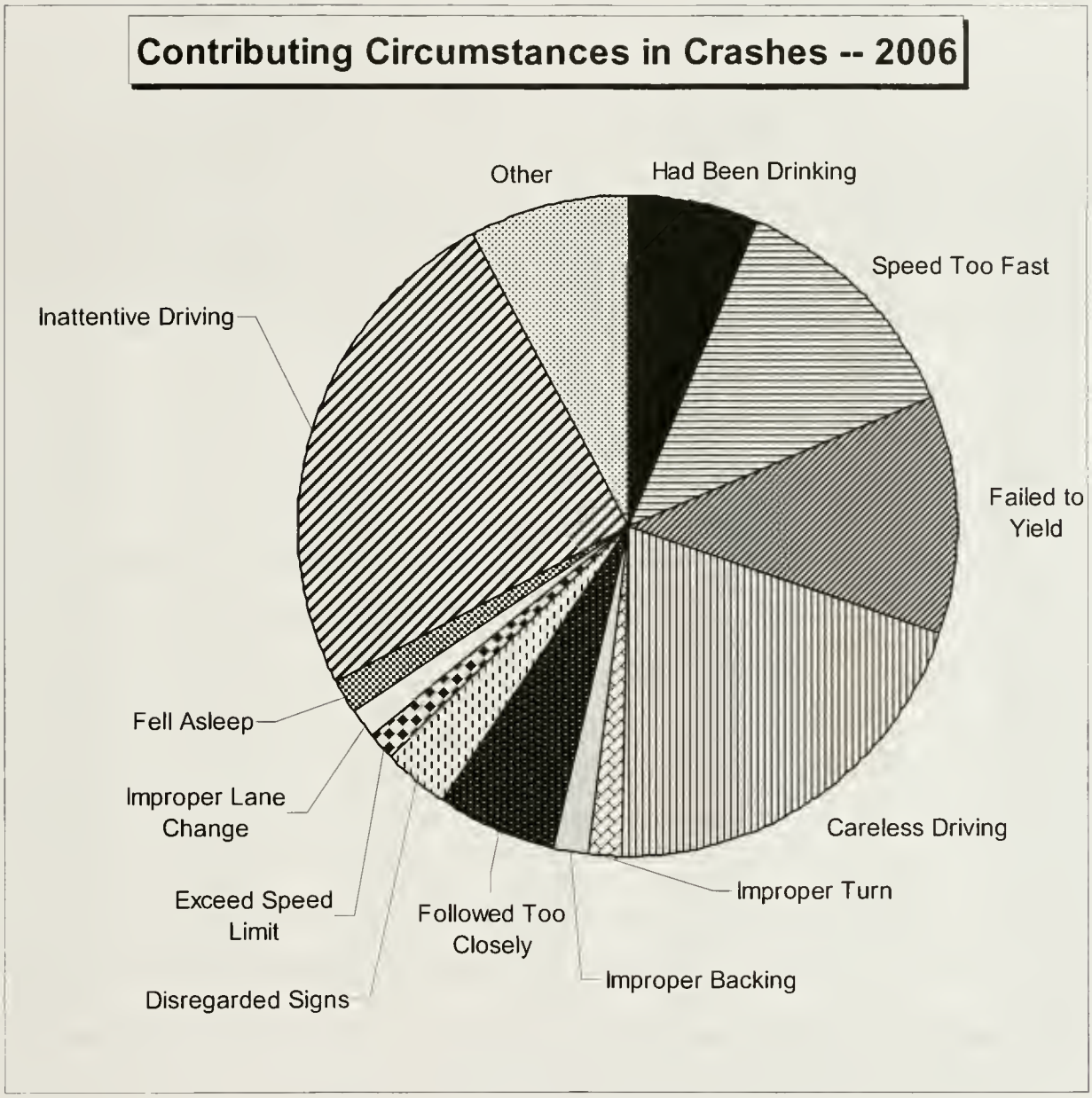
Table 35
Contributing Circumstances Actions Involving Driver

Year	Alcohol	Speed Too Fast	Failed to Yield	Careless Driving	Follow Too Closely	Improper Turn	Improper Backing	Total
2006	1,937	3,634	3,436	5,963	1,722	531	506	17,729

Source: TIS – Montana Department of Transportation

The acquisition of a numerical speed limit in May 1999 affected the category of hazardous actions. Figure 17 on the following page shows a percentage breakout for driver's hazardous actions in crashes for 2006.

Figure 17


Contributing Circumstances in Crashes -- 2006
Other
Had Been Drinking
Speed Too Fast
Inattentive Driving
Failed to Yield
Careless Driving
Improper Turn
Improper Backing
Followed Too Closely
Exceed Speed Limit
Improper Lane Change
Fell Asleep
Disregarded Signs

Single vehicle run off the road crashes are a very high percentage of total crashes in Montana. There is no specific code for running off the road in the Montana crash report. In order to calculate a number that is an estimate, summaries were created where the first harmful event was overturn, immersion, other non-collision, collisions with motor vehicle on another roadway and collision with any fixed object, since these objects would be off the roadway. The table below presents the resulting data.

Table 36
Single Vehicle Run off the Road Crashes

Year	All Crashes			Fatal Crashes		
	Single Vehicle Run off the Road Crashes	All Crashes	Percent of All Crashes	Single Vehicle Run off the Road Fatal Crashes	All Fatal Crashes	Percent of All Fatal Crashes
1997	6,293	22,619	27.8%	141	223	63.2%
1998	6,444	22,068	29.2%	114	208	54.8%
1999	6,403	21,078	30.4%	129	194	66.5%
2000	6,882	22,254	30.9%	107	203	52.7%
2001	6,265	21,846	28.7%	122	201	60.7%
2002	7,211	23,527	30.6%	139	232	59.9%
2003	7,216	23,160	31.2%	144	239	60.3%
2004	6,395	21,783	29.4%	131	209	62.7%
2005	6,808	22,376	30.4%	139	224	62.1%
2006	6,727	22,186	30.3%	138	226	61.1%
Chg 1 Yr	-1.2%	-0.8%	-0.3%	-0.7%	+0.9%	-1.6%
Chg 5 Yr	-0.8%	-1.6%	+0.8%	+2.2%	+2.3%	-0.1%

Source: TIS – Montana Department of Transportation

The same information was calculated for rural crashes only. Single run off the road rural crashes account for an even higher percentage of crashes and fatal crashes. Over half of all rural crashes and nearly two-thirds of rural fatal crashes are instances of run off the road as the first harmful event.

Table 37
Single Vehicle Run off the Road Rural Crashes

Year	Rural Crashes			Rural Fatal Crashes		
	Single Vehicle Run off the Road Crashes	All Rural Crashes	Percent of All Rural Crashes	Single Vehicle Run off the Road Fatal Crashes	All Rural Fatal Crashes	Percent of All Rural Fatal Crashes
1997	5,443	10,921	49.8%	135	208	64.9%
1998	5,603	11,061	50.7%	109	180	60.6%
1999	5,579	11,241	49.6%	121	176	68.8%
2000	5,889	11,637	50.6%	102	185	55.1%
2001	5,246	10,452	50.2%	118	187	63.1%
2002	6,033	11,489	52.5%	132	209	63.2%
2003	6,106	11,746	52.0%	139	214	65.0%
2004	5,409	10,576	51.1%	126	184	68.5%
2005	5,694	10,934	52.1%	130	194	67.0%
2006	5,648	10,939	51.6%	133	209	63.6%
Chg 1 Yr	-0.8%	+0.0%	-1.0%	+2.3%	+7.7%	-5.1%
Chg 5 Yr	-0.9%	-0.9%	+0.0%	+3.1%	+5.8%	-2.7%

Source: TIS – Montana Department of Transportation

Montana usually ranks in the top three states as far as percentage of fatal crashes that are run off the road. This is partly a function of Montana not having a high amount of two or more vehicle fatal crashes, since these tend to occur in more congested areas or on roads with many intersections.

b. Driver's License Compliance

The next table examines the license status of each driver at the time of involvement in an injury or fatality crash. Only the most common status codes are included in the table. The addition of a short crash reporting form, which doesn't capture status of the driver's license has complicated this table. Since short forms are used on some Property Damage Only crashes, this table excludes all property damage crashes and examines injury crashes only to assure data consistency over the ten year period.

Table 38
License Status for Drivers in Injury Crashes
(Injury crashes only)

Year	Valid License	No License	Proba-tionary	Expired	Suspended	Revoked
1997	10,787	360	46	160	219	122
1998	9,883	333	52	151	213	120
1999	9,984	320	51	155	289	150
2000	10,570	320	63	102	280	145
2001	8,908	299	49	75	239	119
2002	9,784	314	49	88	294	112
2003	9,263	296	40	78	304	114
2004	8,947	307	42	73	289	112
2005	9,036	278	35	69	271	100
2006	9,081	291	39	71	346	99
Chg 1 Yr	+0.5%	+4.7%	+11.4%	+2.9%	+27.7%	-1.0%
Chg 5 Yr	-1.2%	-2.6%	-9.3%	-7.3%	+23.8%	-11.1%

Source: TIS – Montana Department of Transportation

Drivers involved in crashes while driving with a suspended license have increased significantly in the last ten years. During 1996 there were 156 of these occurrences and this count was 346 in 2006. Drivers with no license during a crash are decreasing slightly.

4. Traffic Records

Traffic safety data and specifically crash data are an important part of any highway safety program. Without timely and relevant data, a traffic safety program cannot operate efficiently. Countermeasures cannot be developed without the ability to determine where problem areas occur. NHTSA requires the Highway Safety Plan to be data driven and this requires comprehensive, timely data systems.

During April 2004, a Traffic Records Assessment was conducted for Montana. This assessment reported the positives and negatives of traffic records concerning highway safety in the state. Of the many recommendations suggested in this report, the most important was the need to formalize a two-tiered Traffic Records Coordinating Committee across multiple agencies and jurisdictions. The working level committee was established and has met numerous times over the years and is meeting monthly during 2007. There will not be an active executive committee. Instead, a memorandum of understanding between the agencies has been drawn up and signed. Members of the working committee will contact directors or division administrators in their agencies as needed.

Cambridge Systematics completed a Traffic Records Strategic Plan during February of 2006. When NHTSA changed their guidelines, the plan was updated on June 2, 2006. Montana applied for NHTSA 408 funding designated for the improvement of Traffic Records systems within the state and received that funding during September of 2006.

The Traffic Records Coordinating Committee decided to hire a program manager in order to 1) manage the interaction between the various agencies and 2) more efficiently spend funds. The program manager was brought on board at the end of January 2007. The program manager will facilitate the various areas of traffic records and will aid in the organization to link and/or make information more accessible to users. He will have responsibility with the process of applying for future traffic records funding. As part of this process, the program manager will be updating the Traffic Records Strategic Plan for the application.

The linking of data systems across department boundaries requires budget and information technology approvals from the individual Departments and the Department of Administration. Since this will be a time consuming process which will require months or even years, it was felt that this portion of the plan be put off to the later years of funding.

At present, a court tracking system has been deployed to most courts in Montana. The software is called Full Court. Information from the citation is entered into the database along with adjudication information at the court level. The Department of Justice and the Office of Court Administration contracted for a broker to be built that would move the data from the Office of Court Administration to the Department of Justice conviction history data base. This became effective during August of 2006, with some of the large courts currently moving this data to the Department of Justice. Work is continuing on

several systems including fingerprints and e*citations. Once the e*citation project is completed, this would allow entry of citation information at the law enforcement level. If this data could be uploaded to the appropriate court, then this final piece would provide Montana with a citation tracking system. This is a very key part of a Traffic Records system. It would allow the summarization of citation data, which the state does not have currently and it would allow the state to calculate conviction rates for various citation types. This would allow the state to analyze how often and why convictions are not occurring. The final step to reaching this goal would be to have most or all law enforcement agencies enter citations electronically.

The Department of Justice has examined their business practices related to Vehicle Registration, Driver Licensing and Driver Improvement. This project is requiring major changes in their data files and information exchange. They are in the middle of this process and the resulting improvements should greatly affect data availability, linking and exchange. These changes should give better driver histories resulting in quicker and more accurate action, and will provide better available data to law enforcement, judges, prosecutors and highway safety advocates. One recent innovation is that the Department of Justice now allows Montanan's to access their driving record on-line.

The Montana Highway Patrol has contracted to have modifications performed on their crash database (MARS). This will allow for direct transmission of crash reports from vehicle and detachment offices to the database in Helena. This should decrease the lag time in crash data becoming available for analysis. The updated system will allow photos of crash scenes to be attached to the crash reports. Any of the reports that are transferred electronically, will not need to be scanned for use by the Department of Transportation. When the crash report is available, the image of the crash report will also be available, meaning that the image will be available much sooner than in the past.

The Montana Department of Transportation, Montana Highway Patrol and Federal Highway Administration are working toward having all seven Montana reservations provide crash data to the Montana Highway Patrol, without identifiers. This would provide for more complete information on all roads within Montana. Plans are being made to include an observed racial code in the crash report in order to aid in analyzing racial profiling information from enforcement stop databases.

The Department of Transportation has concluded a study on the future direction of GIS. Currently, a requirements document is being prepared for the department. This will pave the way toward implementing a GIS/GPS system with the road inventory and the ability to tie all crash data to the road inventory. The Crash system has the ability to save GPS locations and testing of a sample of GPS data is currently underway. A link between the crash records and the road log could automatically fill some fields on the crash report, thus reducing law enforcement time required to fill out the report.

The Emergency Medical Services and Trauma Systems Section within the Department of Public Health and Human Services will install a trip report database that is NEMSIS compliant. This system is projected to begin providing data sometime during 2007.

5. Emergency Medical Services

Emergency Medical Services differs from many program areas that are related to Traffic Safety because there is no intention of affecting the number of crash occurrences. Theoretically, better EMS will reduce the number of fatalities and complications from severe injuries by reducing response times and improving on site care. Table 39 lists the total number of crashes involving either fatalities or incapacitating injuries by county. This provides a basis for approximating the need of EMS as related to traffic crashes in each county.

Table 39
Severe Injury Crashes by County – 2006

County	Severe Crashes	County	Severe Crashes
Beaverhead	29	McCone	0
Big Horn	22	Meagher	3
Blaine	6	Mineral	25
Broadwater	9	Missoula	189
Carbon	35	Musselshell	8
Carter	2	Park	23
Cascade	58	Petroleum	1
Chouteau	9	Phillips	1
Custer	12	Pondera	6
Daniels	1	Powder River	6
Dawson	7	Powell	16
Deer Lodge	12	Prairie	4
Fallon	0	Ravalli	64
Fergus	18	Richland	12
Flathead	190	Roosevelt	17
Gallatin	91	Rosebud	12
Garfield	1	Sanders	28
Glacier	32	Sheridan	5
Golden Valley	3	Silver Bow	24
Granite	13	Stillwater	16
Hill	13	Sweet Grass	7
Jefferson	30	Teton	9
Judith Basin	3	Toole	11
Lake	52	Treasure	5
Lewis and Clark	111	Valley	12
Liberty	1	Wheatland	1
Lincoln	40	Wibaux	5
Madison	19	Yellowstone	120

Source: TIS – Montana Department of Transportation

The county with the most severe crashes in Montana was Flathead with 190. Missoula County which had the most severe crashes for many years was second with 189. Yellowstone County follows with 120 and then Lewis & Clark has 111.

The Emergency Medical Services and Trauma Systems (EMS & TS) Section is moving forward in the development and/or acquisition and implementation of a new statewide Trip Reports database. This system will allow for the tracking of detailed information of many variables concerning ambulance runs including data related to treatment and procedures given to patients, quality control, response times and much more.

Computers exist in most of the ambulance services in the state, but are in serious need of updating. The services use these computers for training. In addition, the computers will be used for entry of ambulance trip report data. A subset of this data will be transferred to the state EMS & TS Section for statewide informational purposes. Testing at some initial services will begin during June of 2007.

The EMS & TS Section conducted an EMS assessment during June 2005. The results of this assessment are helping the section to direct their future efforts.

6. Young Drivers and Senior Drivers

This section examines the age of the drivers that are involved in traffic crashes. Crash rates per one thousand licensed drivers are calculated. This data provides additional information to improve decisions on targeting specific high-risk age groups. Table 40 contains this age related data.

Table 40
Crashes by Age of Driver
(2006 Crash Data)

Age	Licensed Drivers (FY2006)	Drivers in Crashes	Crashes per 1000 Licenses	Drivers in Fatal Crashes	Fatal Crashes per 1000 Licenses
Under 16	4,814	841	175	5	1.04
16	8,560	1,205	141	2	0.23
17	10,394	1,320	127	4	0.38
18	11,151	1,355	121	6	0.54
19	11,891	1,190	100	11	0.93
20	12,586	1,171	93	9	0.72
Under 21	59,396	7,082	119	37	0.62
21-24	48,336	3,581	74	29	0.60
25-29	63,470	3,322	52	29	0.46
30-34	53,166	2,402	45	19	0.36
35-44	117,831	5,118	43	45	0.38
45-54	149,926	5,336	36	58	0.39
55-64	118,495	3,438	29	35	0.30
65-74	67,847	1,571	23	18	0.27
75+	45,509	1,322	29	21	0.46

Source: TIS – Montana Department of Transportation
Motor Vehicle Division – Department of Justice

Young drivers are over-represented in traffic crashes based upon the number of licensed drivers. Nationally the number of miles driven by teens is less than for drivers of all ages. In fact teens drive approximately 35% fewer miles than average adults. If teen drivers in Montana are similar to the teens across America, then their rate of crashes per vehicle miles driven would be even more extreme than the rate per licensed

driver shown above. Drivers between 15 and 20 years of age were involved in 119 crashes per thousand drivers during 2006. Every other age group over 20 years of age had a rate of 74 or less crashes per thousand licensed drivers. Each higher age group had fewer crashes per licensed driver than the previous age group, with the exception of the "75 year and over" age group. The data suggests that inexperience and/or risk-taking are factors in crash risk for youth. Certainly the change for each year of age between 15 and 20 supports the supposition that experience is a strong factor. It is of interest to note that a 15 year-old driver is seven times more likely to be in a crash than a driver between 65 and 74.

Similarly, the fatal crash rate is somewhat lower for older drivers. Drivers under 21 were involved in 0.62 fatalities per thousand licensed drivers. All age groups above 25 were involved at a rate of 0.46 or less fatalities per thousand drivers. But it is interesting to note that those drivers over 75 have the same rate as those between 25 and 29. This is caused by a higher number of driver errors in combination with those over 75 being more susceptible to severe injury than younger passengers when equal forces are applied.

The following chart shown in Figure 18 shows the change in crash incidence by age of driver. On the page after this chart, Figure 19 shows the change in fatal crash incidence. Note the significant higher rate of the 75 plus age group.

Figure 18

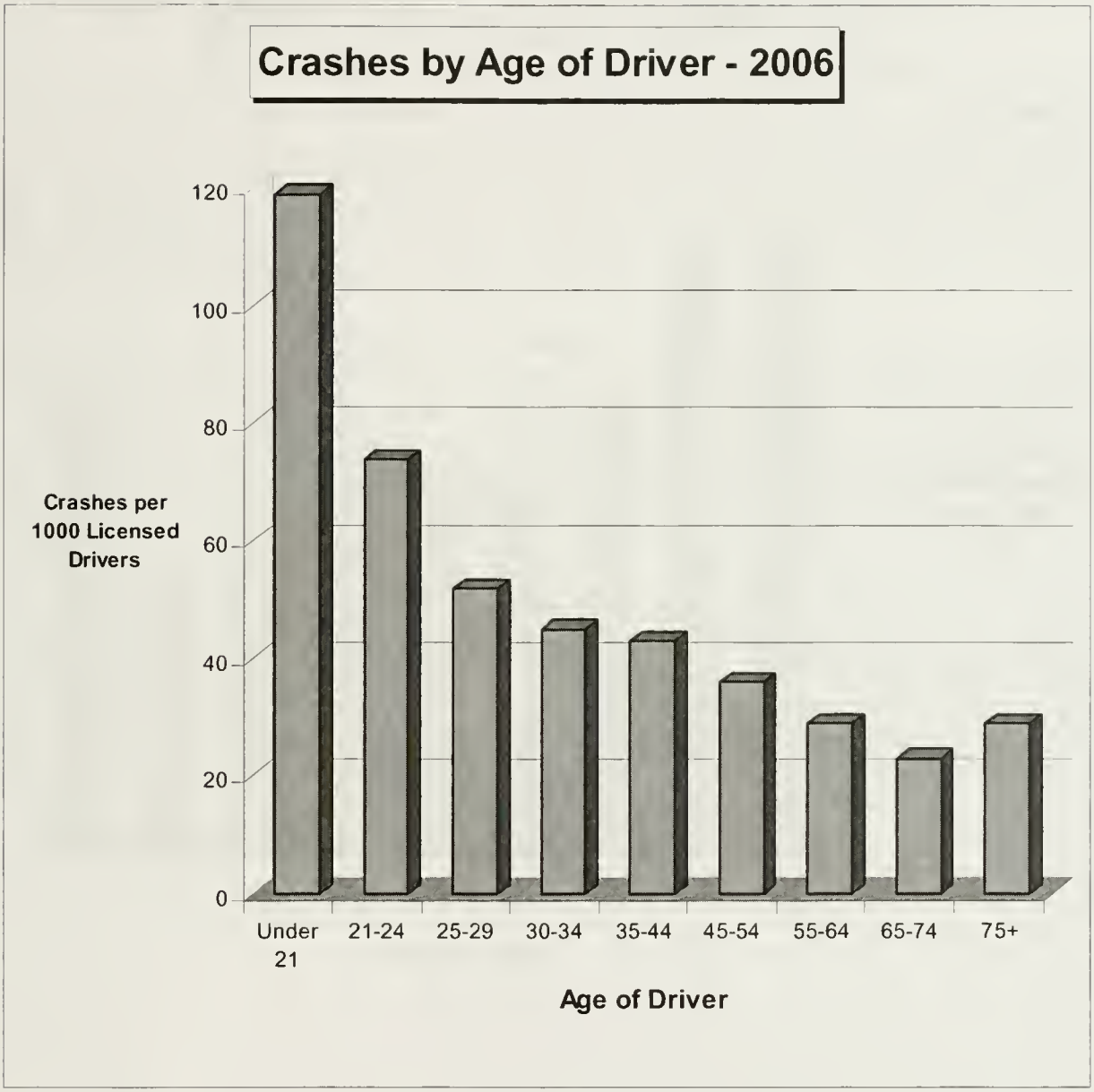
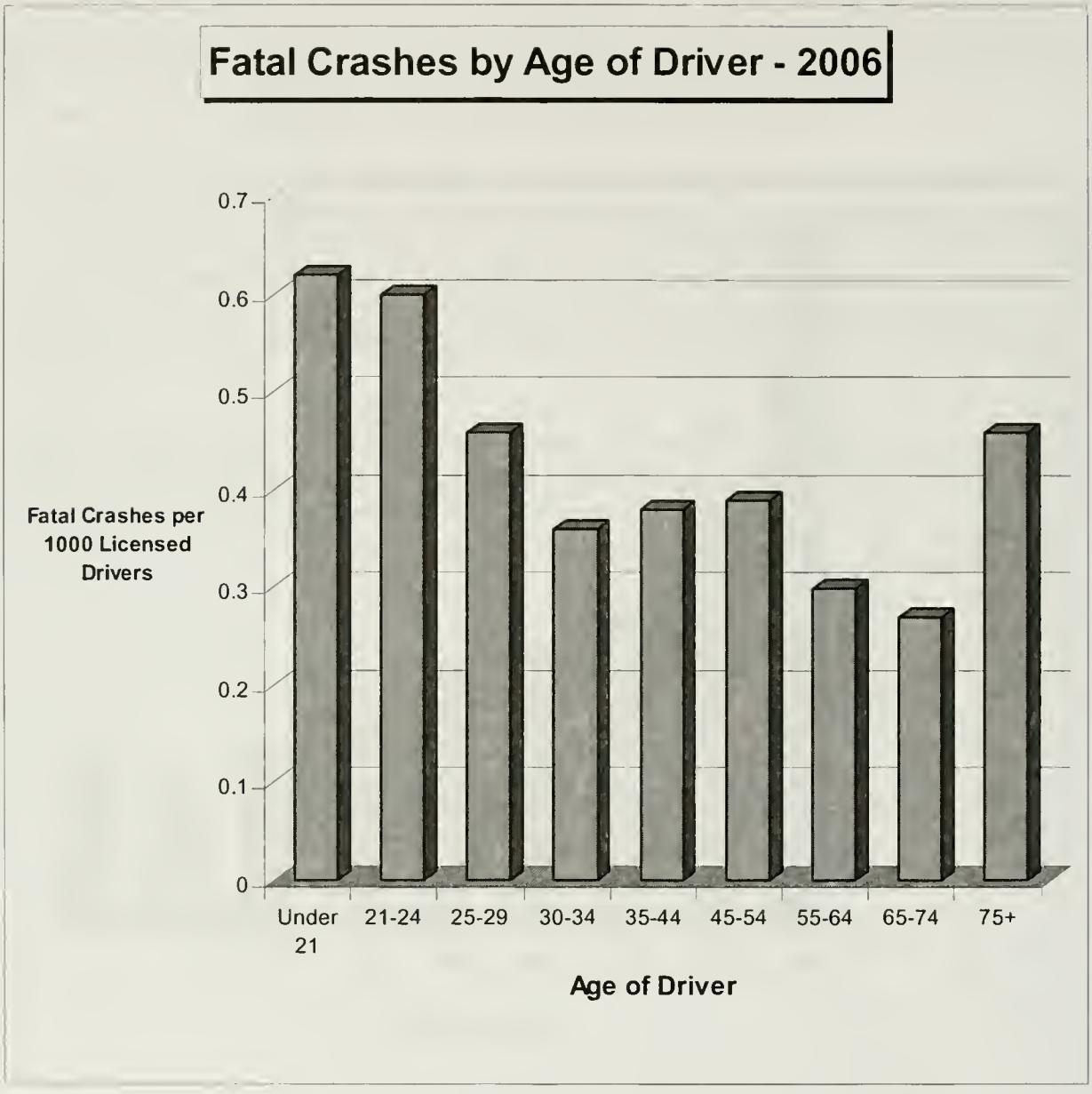

Crashes by Age of Driver - 2006
Crashes per 1000 Licensed Drivers
120
100
80
60
40
20
0
Under 21
21-24
25-29
30-34
35-44
45-54
55-64
65-74
75+
Age of Driver

Figure 19


Fatal Crashes by Age of Driver - 2006
Fatal Crashes per 1000 Licensed Drivers
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Under 21
21-24
25-29
30-34
35-44
45-54
55-64
65-74
75+
Age of Driver

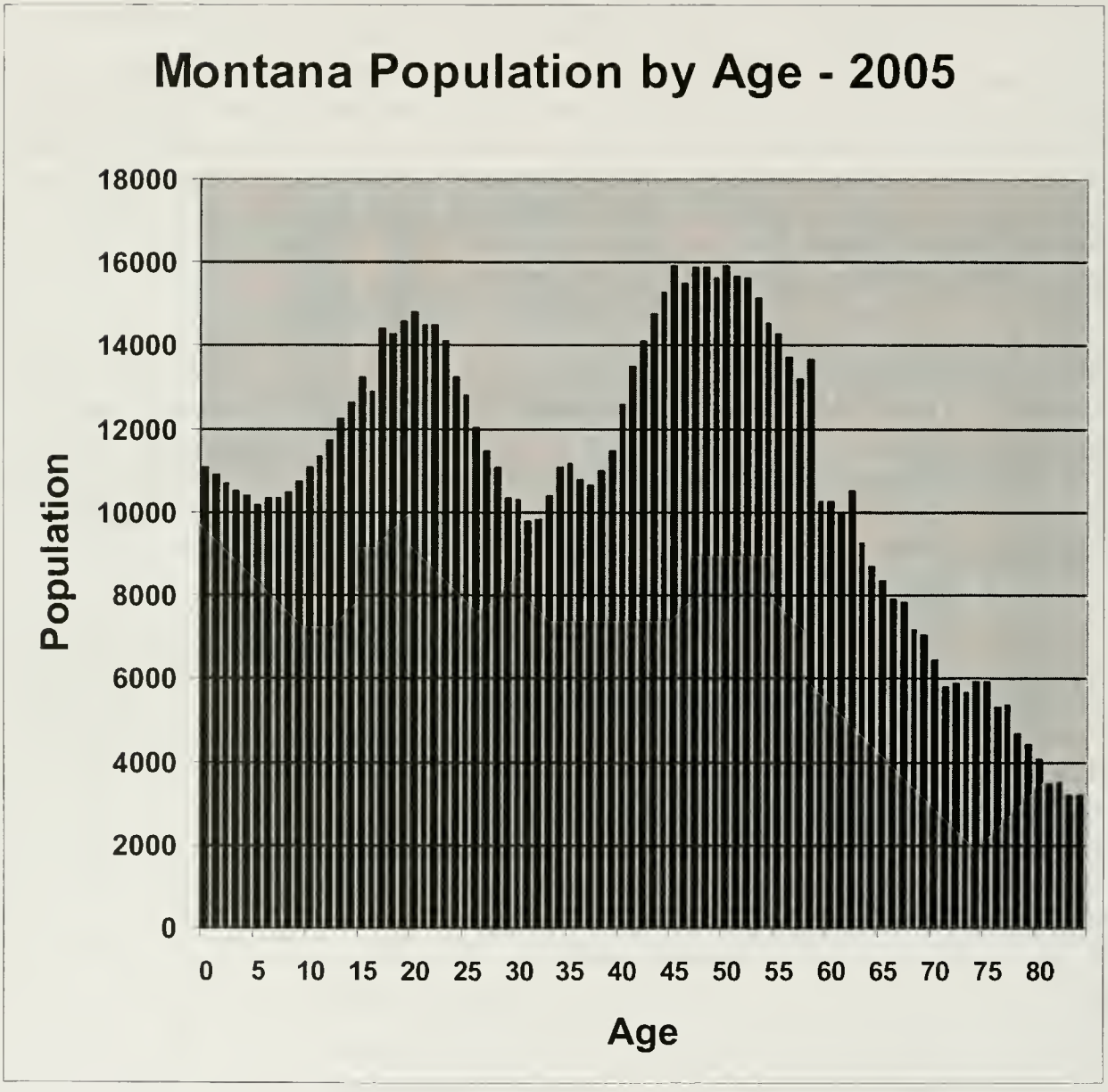
In order to envision the challenges before Montana's citizens in the traffic safety area, the population by age estimate for 2005 is next presented on the following page. During 2005, the baby boom population in Montana seemed to span the age group from 42-58. There is a second boom in Montana from age 13-25. The variation in population for some ages is quite significant. It interesting to note that there are more than 14,000 Montana citizens for each of the ages seventeen to twenty-three and forty-two to fifty-five; but there are less than 10,000 for each of the ages thirty-one and thirty-two.

What does this mean to traffic safety? Over the next twenty years there will be steady growth in the number of drivers over 60 years of age. This will become a significant concern of the traffic safety community as the number of drivers in this group increases. Currently, and over the next few years, Montana will have an above average number of teen and young adult drivers. This is the highest risk group in traffic safety. So the number of elderly drivers and the number of drivers under 30 is increasing while the group of drivers between 30 and 55 will be decreasing.

Some of the gains made in Traffic Safety during the 1980's were related to demographics rather than actual gains. They were achieved in part because the drivers most likely to be in fatal crashes are between 15 and 35. There were less of these drivers during that decade. For the opposite reason, there have been minimal gains over the last ten years because of a high number of teen and young adult drivers. Five to ten years from now, Montana may realize greater improvement as this age group begins moving into their thirties.

These population figures are being noted because of the special challenges that they present to traffic safety. It will be doubly difficult in the near future to show improvement in traffic safety while the number of drivers in the high-risk age groups increases. Some rate improvements may be realized in traffic safety, but it will be much more difficult to decrease the number of incidents relating to these age groups. Population by age is shown on the following page in Figure 20.

Figure 20



Source: Age Estimates - Montana Department of Commerce

7. Motorcycle Involvement in Crashes

Motorcyclists in traffic crashes comprise a relatively small percentage of all persons involved in crashes. However, these persons are at much greater risk when involved in a crash. Because of this, people who ride motorcycles account for a significant amount of Montana's fatalities and serious injuries. Table 41 examines the number of motorcycle registrations, crashes, fatal crashes and injury crashes over the past ten years.

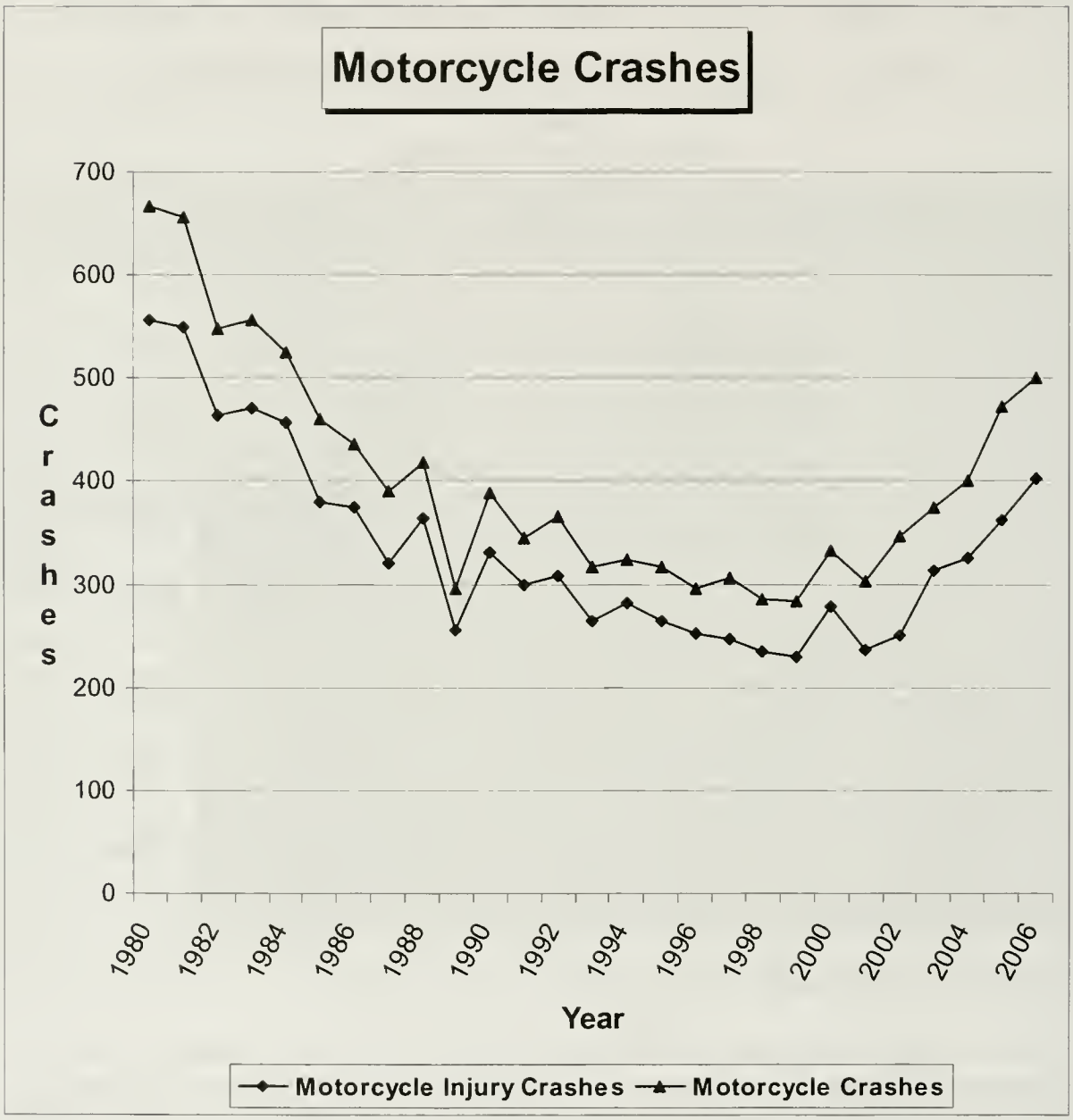
Table 41
Motorcycle Crashes

Year	Motorcycle Regist-rations	Crashes	% of All Crashes	Fatal Crashes	Fatalities	% of all Fatal Crashes	Injury Crashes	% of all Injury Crashes
1997	17,978	307	1.4%	18	20	8.1%	246	3.5%
1998	NA	286	1.3%	13	14	6.3%	235	3.5%
1999	NA	284	1.3%	15	15	7.7%	229	3.4%
2000	NA	332	1.5%	13	13	6.4%	279	4.0%
2001	25,618	302	1.4%	11	12	5.5%	236	3.8%
2002	28,111	347	1.5%	24	24	10.3%	251	3.9%
2003	34,433	375	1.6%	12	12	4.6%	314	5.0%
2004	42,967	400	1.8%	20	20	9.6%	325	5.4%
2005	64,841	473	2.1%	28	28	12.5%	362	6.0%
2006	80,095	501	2.3%	25	26	11.1%	402	6.4%
Chg 1 Year	+23.5%	+5.9%	+9.5%	-10.7%	-7.1%	-11.1%	+11.0%	+6.7%
Chg 5 Year	+104.4%	+32.1%	+36.9%	+31.6%	+35.4%	+30.6%	+35.1%	+32.8%

Source: TIS – Montana Department of Transportation

Beginning in 2005, motorcycle registrations became a one time registration rather than an annual registration. Since motorcycle registrations don't expire there is no longer a method to determine registrations for active motorcycles. Registration counts cannot be used for rates. Vehicle miles traveled by motorcycles are currently unable to be calculated because of technology issues. So there is no valid data to determine rates and trends. Figure 21 on the following page shows the trend in motorcycle crashes and injuries. Motorcycle involved crashes as a percentage of all crashes, fatal crashes and injury crashes are all increasing in Montana. This is thought to be primarily because there are more motorcycles being driven in the state.

Figure 21


Motorcycle Crashes
700
600
500
400
300
200
100
0
Crashes
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
Year
Motorcycle Injury Crashes
Motorcycle Crashes

Helmet usage for drivers and passengers in motorcycle crashes is displayed in the following table. For most age groups in crashes, usage was between 40 and 50 percent.

Table 42
Motorcycle Helmet Use by Age
(2006 Crash Data)

Age	Driver		Passenger	
	Used	Not Used	Used	Not Used
14 & Under	6	3	5	3
15-17	1	4	1	2
18-19	11	8	0	1
20-24	35	37	4	3
25-34	34	47	5	9
35-64	113	167	17	23
65 & Over	12	8	0	0
Not Stated	0	15	1	0
Total	212	289	33	41

Source: TIS - Montana Department of Transportation

The observational helmet use survey estimates a 65 percent usage rate for 2006. Usage on interstate routes was relatively high at 82%. Primary route usage was 60%, while city usage was lower at 52%. Secondary and county roads had 66% on only 32 observations. The overall statewide usage rate is derived from only 283 observations making the precision of the estimate less than desirable. This small sample size means that there is 95 percent confidence that the estimate is within 6 percentage points of the actual usage. In addition, there may be sampling error problems, since there is so much through state motorcycle travel in the summer and there may be an overrepresentation of motorcycles on rural roads where helmet wear tends to be highest. Without VMT data there is no way to collect a proper sample.

Of the crashes involving motorcyclists, 38.3% of the crashes involve a fatal or severe injury. In crashes of all vehicle types only 6.5% of the crashes have this level of injury. The chance of severe injury is about six times higher when riding motorcycles. Severe injuries have a large impact because of the medical costs and continuing care costs to the public and private sectors.

Differences between riders from crashes involving a motorcycle and drivers from all crashes were investigated. There were two different fields where motorcyclist exhibited worse characteristics than the general driver. These are shown in Table 43 below.

Table 43
Comparison of Motorcycle Drivers and All Drivers
(2006 Crash Data)

Driver Status	MC Drivers	All Drivers
Driver's by Sobriety – Alcohol or Drugs Present	11.2%	6.3%
No License, Suspended, Canceled, Expired or Revoked	9.7%	6.2%

Source: TIS - Montana Department of Transportation

In the next table, we examine the age of motorcycle fatal crash victims. Most fatalities in past decades occurred in the 20-34 year age group. However, in recent years there has been a shift occurring with most fatalities coming from over 35 years of age. A few fatalities are even occurring in the 65 and over age group, which prior to 1995 was a rarity.

Table 44
Motorcycle Fatalities by Age

Year	Age Groups							
	0-14	15-17	18-19	20-24	25-34	35-64	65+	Total
1997	0	1	2	2	4	11	0	20
1998	0	0	1	0	3	8	2	14
1999	0	0	0	2	3	10	0	15
2000	0	0	0	3	1	8	1	13
2001	0	0	0	2	2	6	2	12
2002	0	1	0	3	3	14	3	24
2003	0	0	0	1	2	7	2	12
2004	0	2	0	2	1	10	5	20
2005	0	0	0	3	5	18	2	28
2006	1	0	1	3	4	17	0	26
10 Yr Total	1	4	4	21	28	109	17	184

Source: TIS – Montana Department of Transportation

8. Collisions with Pedestrians

A general summary of pedestrian collisions is displayed below in Table 45. Pedestrian crashes during 2006 accounted for 5.3% of all fatal crashes, but less than one percent of all crashes.

Table 45
Motor Vehicle Collisions with Pedestrians

Year	Crashes	% of All Crashes	Fatal Crashes	% of all Fatal Crashes	Fatalities	Injury Crashes	Injuries
1997	167	0.7%	9	4.0%	9	136	146
1998	166	0.8%	13	6.3%	13	135	148
1999	153	0.7%	7	3.1%	7	128	139
2000	161	0.7%	11	5.5%	11	139	148
2001	167	0.8%	9	4.5%	9	141	163
2002	174	0.7%	14	6.0%	14	152	164
2003	163	0.7%	10	4.2%	10	138	158
2004	156	0.7%	10	4.8%	10	114	124
2005	148	0.7%	14	6.3%	14	131	141
2006	147	0.7%	12	5.3%	12	120	131
Chg 1 Year	-0.7%	---	-14.3%	-15.9%	-14.3%	-8.4%	-7.1%
Chg 5 Year	-9.0%	-2.8%	+5.3%	+2.7%	+5.3%	-11.2%	-12.7%

Source: TIS – Montana Department of Transportation

Table 46 lists the pedestrian injuries plus fatalities by age. Injuries from pedestrians makes up a small percentage of total injuries in the state, but the number of pedestrian fatalities still makes up a significant amount of the total number of fatalities. Injuries seem to be on the increase for pedestrians from 35 to 64 years of age. The baby boom is in the middle of this age group and may account for much of this increase.

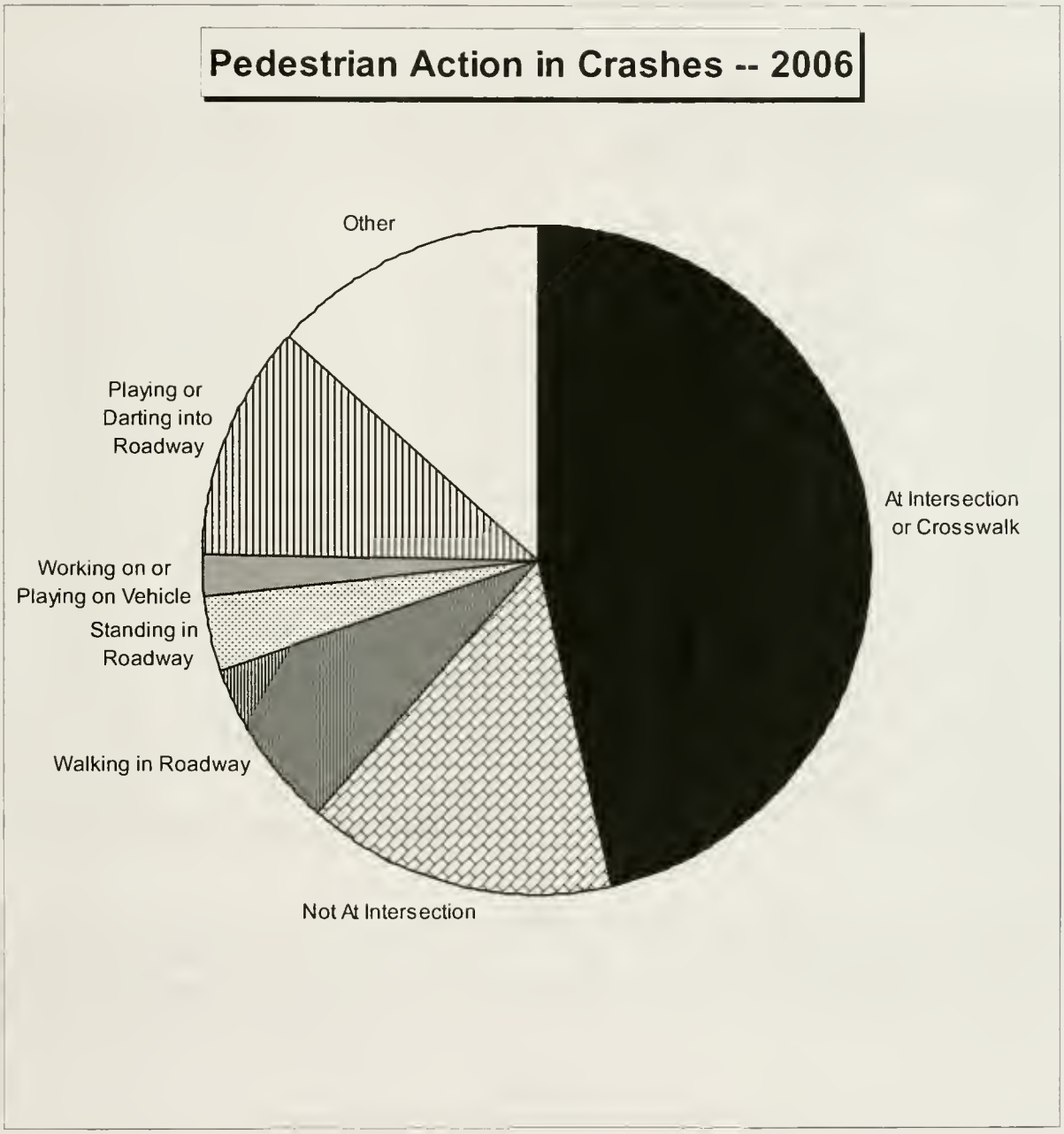
Table 46
Pedestrian Fatalities and Injuries by Age – 2006

0-4	5-14	15-24	25-34	35-44	45-54	55-64	65+	Total
5	25	26	14	17	30	10	16	143

Source: TIS – Montana Department of Transportation

Figure 22 on the following page shows a pie chart for all pedestrian collisions by pedestrian action during 2006.

Figure 22


Pedestrian Action in Crashes -- 2006
Other
Playing or Darting into Roadway
Working on or Playing on Vehicle
Standing in Roadway
Walking in Roadway
Not At Intersection
At Intersection or Crosswalk

9. Collisions with Bicyclists

Bicycle crashes with motor vehicles, was higher than any year since 2001. For the first time in five years the number of crashes involving bicycles increased. Two bicycle related fatalities occurred during 2006. The summary data is presented in Table 47.

Table 47
Motor Vehicle Collisions with Bicyclists

Year	Crashes	Percent of All Crashes	Fatalities	Percent of all Fatalities	Injuries
1997	224	0.99%	1	0.38%	202
1998	198	0.90%	1	0.42%	183
1999	178	0.84%	3	1.36%	183
2000	200	0.90%	8	3.40%	177
2001	177	0.81%	0	0.00%	163
2002	172	0.73%	1	0.37%	158
2003	170	0.73%	2	0.76%	153
2004	167	0.77%	2	0.87%	149
2005	157	0.70%	4	1.59%	137
2006	176	0.79%	2	0.76%	155
Chg 1 Year	+12.1%	+12.9%	-50.0%	-52.2%	+13.1%
Chg 5 Year	+4.4%	+5.6%	+11.1%	+5.8%	+2.0%

Source: TIS – Montana Department of Transportation

Table 48 presents bicyclist casualties (fatalities + injuries) by age. The 10-14 year old age group remains the highest risk group. In recent years, the age group from zero to nine has decreased in number of injuries, while the age groups ranging from 35 to 54 have increased in casualties.

Table 48
Bicyclist Casualties by Age – 2006

0-9	10-14	15-19	20-24	25-34	35-44	45-54	55+	Total
15	29	24	20	17	22	15	12	154

Source: TIS – Montana Department of Transportation

10. Truck Involvement In Crashes

This section examines Montana crashes involving trucks. The table that follows contains a ten-year history of truck-involved crashes within the state. This analysis is not for commercial trucks only, but for all trucks. The database containing commercial vehicle crash data within Motor Carrier Services will not coincide with the data shown below.

The number of truck crashes reached a high in 1996 and has decreased by nearly 30% over the ten years since then. The number of fatal crashes involving trucks was down slightly from 2005.

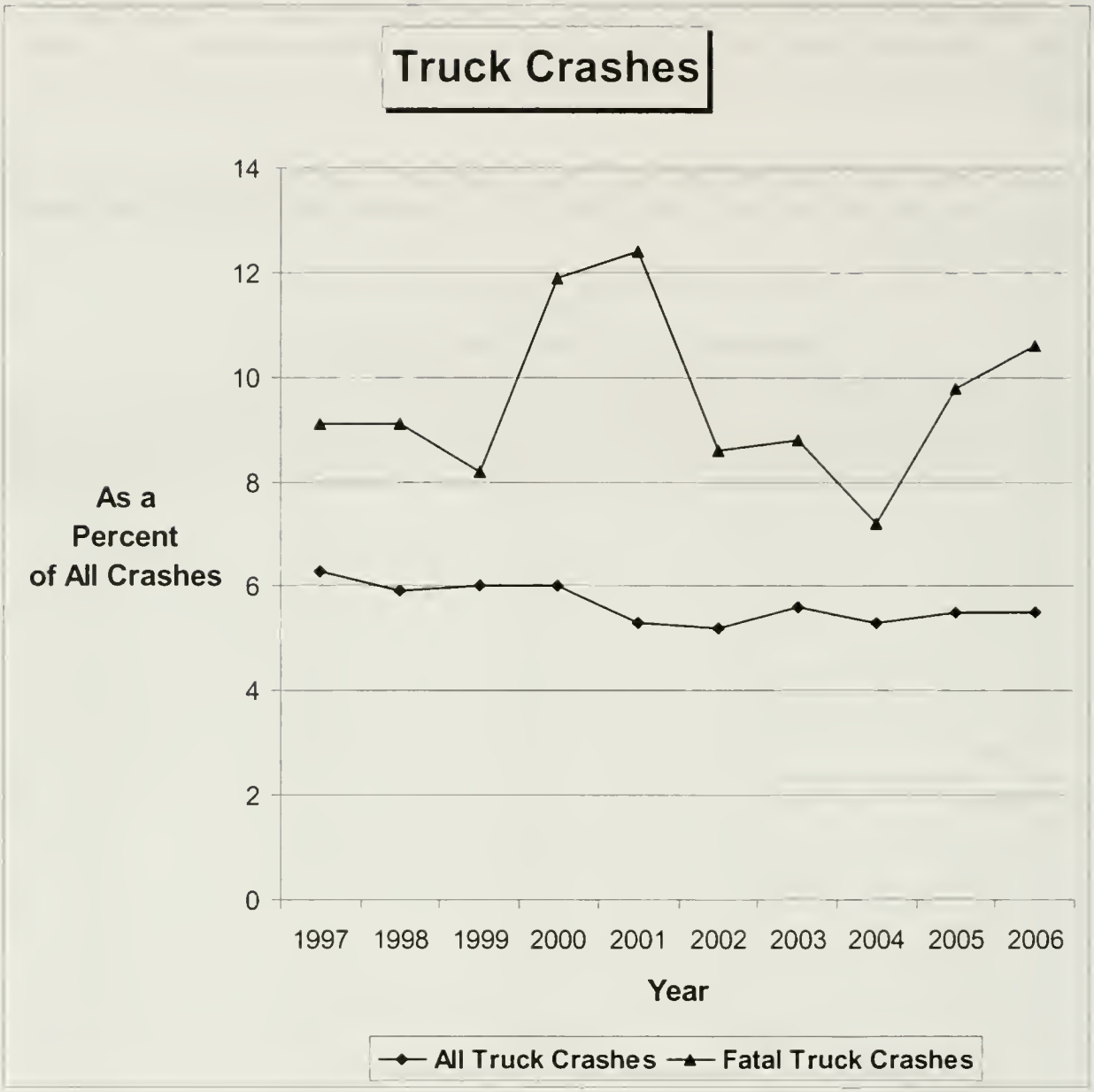
Table 49
Number of Crashes Involving Trucks

Year	Crashes		Fatal Crashes	
	Number	Percent of all Crashes	Number	Percent of all Fatal Crashes
1997	1426	6.3%	24	9.1%
1998	1310	5.9%	19	9.1%
1999	1262	6.0%	16	8.2%
2000	1346	6.0%	24	11.9%
2001	1159	5.3%	25	12.4%
2002	1228	5.2%	20	8.6%
2003	1288	5.6%	21	8.8%
2004	1163	5.3%	15	7.2%
2005	1241	5.5%	22	9.8%
2006	1227	5.5%	24	10.6%
Chg 1 Year	-1.1%	---	+9.1%	+8.2%
Chg 5 Year	+0.9%	+2.2%	+16.5%	+13.2%

Source: TIS - Montana Department of Transportation

Figure 23 on the following page shows the number of truck crashes as a percentage of all motor vehicle crashes and fatal truck crashes as a percentage of all motor vehicle fatal crashes.

Figure 23


Truck Crashes
As a Percent of All Crashes
14
12
10
8
6
4
2
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
Year
All Truck Crashes
Fatal Truck Crashes

This table presents the type of trailer for trucks. All configuration types had a high number of crashes during 1996, which were likely caused by abnormally icy roads. The counts below include trucks and truck/tractor combinations.

Table 50
Truck Crashes by Trailer Type

	Crashes				Fatal Crashes			
Year	No Trailer*	Single Trailer	Double Trailer	Triple Trailer	No Trailer	Single Trailer	Double Trailer	Triple Trailer
1997	424	893	106	3	3	18	3	0
1998	393	785	131	1	5	12	2	0
1999	336	800	125	1	5	8	3	0
2000	328	905	111	2	5	19	0	0
2001	335	722	102	0	2	20	3	0
2002	340	801	84	3	6	12	2	0
2003	470	712	100	6	8	13	2	0
2004	461	634	103	2	6	9	1	0
2005	509	701	92	1	8	13	2	0
2006	534	649	84	3	13	10	2	0
Chg 1 Yr	+4.9%	-7.4%	-8.7%	+200%	+62.5%	-23.1%	---	---
Chg 5 Yr	+26.2%	-9.1%	-12.7%	+25.0%	+217%	-25.4%	---	---

Source: TIS – Montana Department of Transportation

* Trucks with no trailer would include single unit vehicles. This could also include Tractor-Trucks that currently are not pulling a trailer.

11. Other Issues and Information

a. Buses and Unusual Vehicle Involvement in Crashes

This section displays data for unusual vehicles such as buses, ambulances, farm machinery and fire trucks. Table 51 contains data on the number of crashes involving these unusual vehicles for a ten-year period.

Table 51
Unusual Vehicle Types in Crashes

Year	School Bus	Bus	Ambulance	Farm Machinery	Fire Truck	Snow-mobile
1997	73	71	14	32	12	14
1998	48	58	11	32	15	13
1999	63	60	9	16	8	12
2000	59	67	10	23	11	5
2001	65	69	8	15	12	6
2002	83	76	13	16	5	4
2003	66	63	11	18	10	3
2004	65	65	13	18	7	1
2005	80	71	3	11	7	5
2006	71	78	15	27	11	5
Chg 1 Yr	-11.2%	+9.9%	+400%	+145%	+57.1%	---
Chg 5 Yr	-1.1%	+13.4%	+56.3%	+73.1%	+34.1%	+31.6%

Source: TIS – Montana Department of Transportation

Ambulance, Farm Machinery and Fire Truck crash numbers were all well above the five-year average. Snowmobiles certainly seem to be trending much lower than earlier years.

b. Collisions with Animals or Avoidance

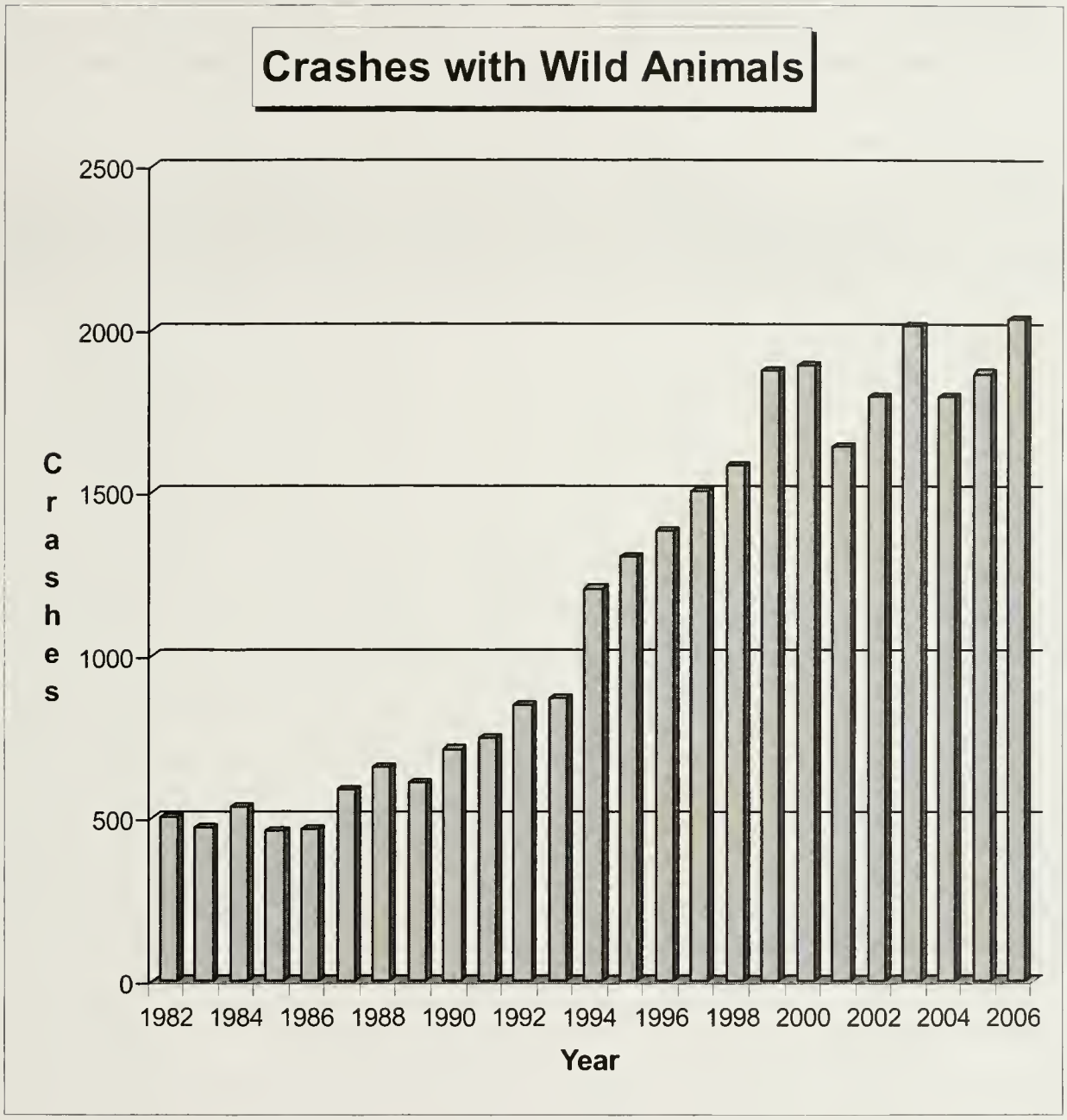
During the twenty-year period from 1984 to 2003, the number of reported crashes involving wild animals increased from 468 to 2,012. This number has leveled off during the last three years as shown in Table 52. The key word in the first sentence is 'reported', since many animal crashes are not reported. The long-term trend is shown on the following page in Figure 23. The number of crashes involving domestic animals has shown no trend over the years.

Table 52
Crashes Involving Animals

Year	Crashes With Wild Animals	Fatal Crashes With Wild Animals	Crashes With Domestic Animals	Fatal Crashes With Domestic Animals
1997	1,506	3	241	3
1998	1,585	0	262	2
1999	1,875	0	298	2
2000	1,891	1	237	1
2001	1,643	3	201	1
2002	1,796	3	239	3
2003	2,012	3	234	1
2004	1,794	2	233	4
2005	1,866	5	194	2
2006	2,034	4	203	1
Chg 1 Year	+9.0%	-20.0%	+4.6%	-50.0%
Chg 5 Year	+11.6%	+25.0%	-7.8%	-54.5%

Source: TIS – Montana Department of Transportation

Figure 23


Crashes with Wild Animals
2500
2000
1500
1000
500
0
Crashes
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
Year

c. Railroad Crossing Safety

Motor vehicle collisions with trains are a relatively rare event, but the severity of such collisions is often very high. Table 53 presents a history of these collisions on public roadways in Montana for rural roads and for all roadways. Crashes in rural areas may be declining.

Table 53
Collisions with Trains

Year	Rural			Total		
	Crashes	Fatal Crashes	Injury Crashes	Crashes	Fatal Crashes	Injury Crashes
1997	20	0	11	28	0	16
1998	16	2	6	24	2	11
1999	11	1	4	12	1	4
2000	19	1	6	22	1	6
2001	7	0	2	9	0	2
2002	9	1	3	20	2	6
2003	2	0	0	19	3	3
2004	10	0	4	15	0	5
2005	9	1	4	14	1	4
2006	8	1	5	11	1	7
Chg 1 Yr	-11.1%	---	+25.0%	-21.4%	---	+75.0%
Chg 5 Yr	+8.1%	+150%	+92.3%	-28.6%	-16.7%	+75.0%

Source: TIS – Montana Department of Transportation

E. COUNTY RANKING

The following section places a ranking on the 56 counties in Montana. This ranking is one of several factors used to determine funding level for safety programs. The first three categories are indices of traffic safety problems, while the last one indicates level of local enforcement in seat belt convictions, or ability to respond to the problem. There are a number of ways to calculate a ranking and this is simply one possible method.

Table 54

County Ranking for Traffic Safety

Rank	County	Severe Crash Rank	Alcohol Crashes Rank	Ped+Bike +Mcycle Rank	Restraint Conv Rank	Sum of Ranks
1	Missoula	2	3	2	1	8
2	Yellowstone	3	1	1	5	10
2	Flathead	1	2	4	3	10
4	Cascade	7	4	3	2	16
5	Gallatin	5	5	6	6	22
5	Lewis and Clark	4	6	5	7	22
7	Ravalli	6	8	7	10	31
8	Silver Bow	16	9	9	4	38
9	Lake	8	7	10	24	49
9	Carbon	10	15	8	16	49
11	Hill	24	10	13	8	55
12	Sanders	14	12	12	20	58
13	Big Horn	18	15	16	17	66
14	Lincoln	9	17	11	32	69
14	Park	17	13	13	26	69
16	Beaverhead	13	19	25	15	72
17	Jefferson	12	13	13	36	74
18	Richland	26	17	19	13	75
19	Glacier	11	10	16	42	79
20	Custer	26	25	21	11	83
21	Valley	26	26	19	13	84
22	Stillwater	22	21	21	23	87
23	Madison	19	22	29	20	90
24	Dawson	36	23	29	9	97
25	Roosevelt	21	19	16	42	98
26	Fergus	20	23	21	36	100
27	Rosebud	26	31	29	19	105
28	Sweet Grass	36	27	26	18	107
29	Mineral	15	31	21	42	109

Table 54 (continued)						
Rank	County	Severe Crash Rank	Alcohol Cr+Inj+F Rank	Ped+Bike +Mcycle Rank	Restraint Conviction Rank	Sum of Ranks
30	Granite	24	35	29	32	120
31	Deer Lodge	26	29	39	29	123
32	Musselshell	35	38	39	12	124
32	Broadwater	32	29	39	24	124
34	Teton	32	39	29	29	129
35	Toole	31	28	29	42	130
36	Powell	22	34	35	42	133
37	Pondera	38	41	26	29	134
38	Blaine	38	31	46	32	147
39	Golden Valley	45	45	39	20	149
40	Chouteau	32	35	46	42	155
41	Meagher	45	47	28	36	156
41	Powder River	38	47	35	36	156
43	Wibaux	41	45	35	36	157
44	Fallon	55	41	39	26	161
45	Judith Basin	45	41	35	42	163
45	Sheridan	41	41	39	42	163
47	Wheatland	49	35	46	36	166
48	Phillips	49	39	39	42	169
48	Prairie	44	47	46	32	169
50	Daniels	49	51	46	26	172
51	Treasure	41	50	46	42	179
52	Garfield	49	51	46	42	188
53	Carter	48	54	46	42	190
54	Petroleum	49	54	46	42	191
55	Liberty	49	54	46	42	191
56	McCone	55	51	46	42	194

Source: TIS – Montana Department of Transportation

The four rankings are summed and then those totals are ordered. This table can be used as a very general ordering for traffic safety problems and solutions by county. Other considerations are often used including high crash corridors.

Some counties or cities within counties will have special safety problems that are not represented by the above table and these instances will be taken into account if necessary. Many counties and cities will not have sufficient resources to manage an attack on their safety problems. Sometimes, several counties or cities may work together on certain issues.

Cost benefit is a factor when funding counties. If a large benefit can be gained with a small amount of money, this could override a project in a higher priority county. There is a limited amount of funding and sometimes this funding is earmarked to certain areas. This and other factors may also override priorities.

Conclusion

The Problem Identification for FY 2008 explores many traffic safety issues in Montana. It is a compilation, which contains a large amount of varied data. There is much statistical "noise" in the various data, since there are so many variables that affect crashes including but not limited to driver behavior, vehicles, road characteristics, weather conditions, road conditions, laws and even something as simple as a change to a reporting form. It is difficult to reach significance because of these many factors along with the relatively small number of crashes and fatal crashes in the state.

This paper should be used as a guide when looking at the traffic safety problem or when attempting to find solutions for Montana traffic safety. Often it is safer to look at long-term trends, rather than a one-year increase or decrease which may have occurred from something as simple as an unusual winter or statistical variation. A change of 30 fatalities is not significant in Montana and can be caused by simple statistical variation. Perhaps a particular traffic safety intervention had no impact at all, but some other variable created the perceived result. Care should always be given that you don't make assumptions for the cause of certain situations without looking at all possibilities. When in doubt one should error on the side of caution.

Questions or comments on this study should be directed to the State Highway Traffic Safety Office at the Montana Department of Transportation. For additional information call the office at (406) 444-3298.